JANUARY • 1961

FIREMEN

VOLUME 28, NUMBER 1, COPYRIGHT © 1961 NATIONAL FIRE PROTECTION ASSOCIATION PRINTED IN U. S. A.

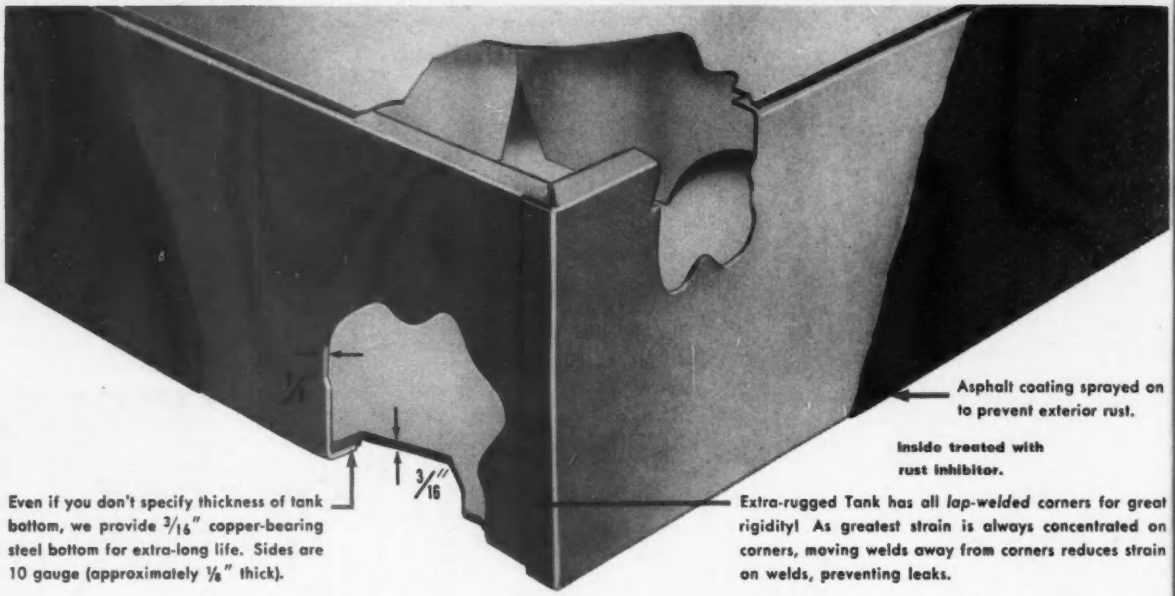
Sudden Death in New York — *see page 7*

IONAL FIRE
TECTION
OCIATION

65th year

CAVITATION IN FIRE PUMPS - - - - page 8

BARGE FIRE IS TOUGH PROBLEM - - page 10



Even if you don't specify thickness of tank bottom, we provide 3/16" copper-bearing steel bottom for extra-long life. Sides are 10 gauge (approximately 1/8" thick).

Extra-rugged Tank has all *lap-welded* corners for great rigidity! As greatest strain is always concentrated on corners, moving welds away from corners reduces strain on welds, preventing leaks.

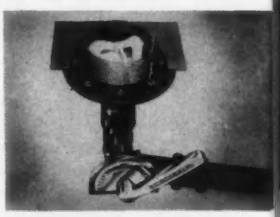
You get *more* superior features on American Fire Trucks even though you don't actually specify them...

You can order American Fire Apparatus with confidence that *our* rigid standards of quality *carry far beyond* your written specifications.

For example, corners and seams on all American booster tanks are *lap-welded* — not corner welded. This greatly increases rigidity — resists twisting strain — prevents troublesome leaks. *And whether you think to specify or not, all* tank bottoms are 3/16" copper-bearing steel for extra years of trouble-free life. Remember — 3/16" is *one-and-one-half times thicker* than the 10 gauge bottoms usually furnished.

Other standard features include: Multiple drains on pump, all connected to a single, central valve — so a hurried fireman *can't* "forget" to open or close one of several drains.

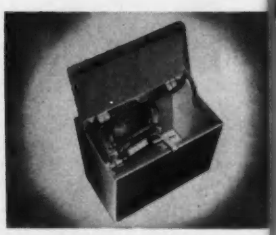
These and other engineering extras that really count are always provided on American Fire Apparatus at no extra cost — even though *not* mentioned in your specifications! Make sure you get these superior features!



Tank Outlet Sump has large bolted flange — *eliminates* need for costly removable top and resulting gasket problems, or sloping bottom with reduced capacity. Anti-swirl baffles keep air out, prevent loss of prime, and insure complete tank drainage.

Contact your nearest American representative for full details.

Choose either midship or front-mounted pump.



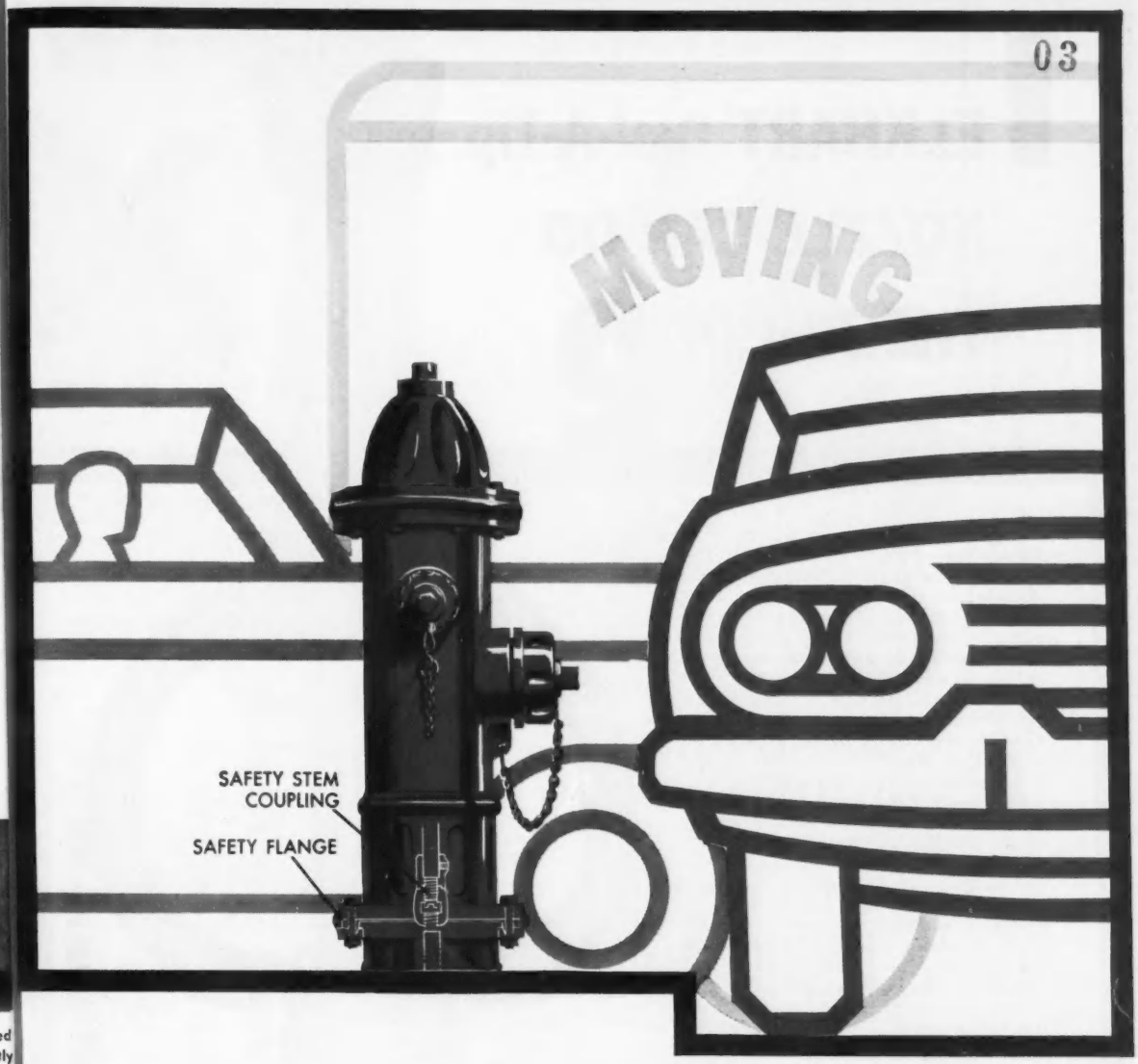
Patented Rear Tank Filler is also Pressure Relief Valve when filling from hydrant. Opens for filling with buckets. Strainer catches debris.

American

AMERICAN FIRE APPARATUS CO.

FIRE APPARATUS CO. Always Pioneering with Better Engineering

Main Office: Main Street Rd., Battle Creek, Mich. Plants at: BATTLE CREEK, MICH., MARSHALLTOWN, IA., STRATFORD, ONT.



TRAFFICPROOF

No water loss!

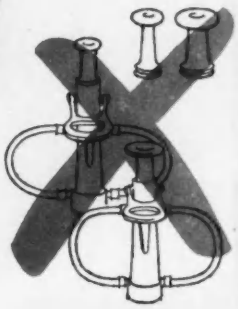
Repair traffic damage to hydrants *fast*... without loss of water... without water shut-off... without digging. Today's heavy traffic means frequent accidents involving hydrants. These accidents can mean time-consuming repairs to your hydrants and temporary loss of fire protection. To keep your fire protection system at peak efficiency and hydrant repair costs at a bare minimum, specify Mueller AWWA Improved Fire Hydrants. Vehicle impact separates this hydrant cleanly at the safety flange and safety stem coupling *with no water loss!* A simple, inexpensive repair kit restores a traffic-damaged Mueller hydrant in minutes. Write for complete details.

MUELLER CO.
DECATUR, ILL.

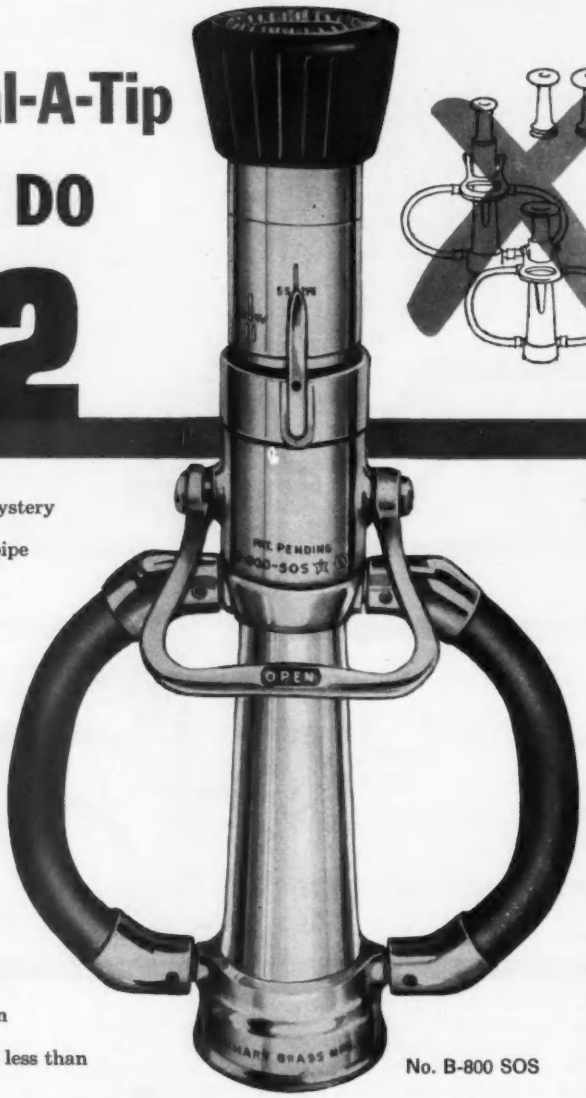
Factories at: Decatur, Chattanooga, Los Angeles
In Canada: Mueller, Limited, Sarnia, Ontario

5585

1 ELKHART Dial-A-Tip NOZZLE CAN DO THE JOB OF 2



It's a fact. This new patented Dial-A-Tip Mystery Nozzle can replace two nozzles: (1) The Underwriters' required straight stream playpipe combination, and (2) The old style fog playpipe combination. Saves time at the fire scene . . . saves space on the pumper . . . saves money, too! This nozzle has three calibrated straight stream positions: ⅞", 1" and 1⅛" which at 100 p.s.i. nozzle pressure throw 175, 225 and 250 G.P.M. respectively. It is also rated at 275 G.P.M. at 30° fog at 100 p.s.i. *These gallonages are verified by Underwriters' Laboratories tests.* Actually, any gallonage can be dialed in the straight stream position from 250 G.P.M. down to that of of a booster hose. In addition, the nozzle has an adjustable seat, raised stream indicators and Mystery nozzle teeth. An important design feature of the B-800 SOS places approximately 80% of its weight in front of the playpipe handles. This helps balance the weight of the hose and makes it easier to handle. By making the shutoff an integral part of the playpipe, the weight of this nozzle has been reduced 20% to 25% less than comparable playpipe combinations.



No. B-800 SOS

Normally supplied with ladder hook and rigid 2½" base, available with swivel base. Can be ordered without ladder hook.

Base thread 2½". Bottom of tip and top of playpipe Underwriters' or any 1½" thread. Polished Brass or Chromium plated finish.

For fog tip only, specify No. B-200 SOS

Dial-A-Tip Direct Connection Nozzle

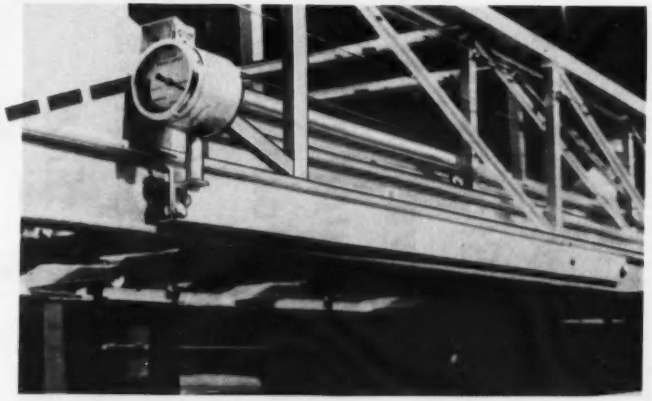
Elkhart No. DB-200 SOS offers identical features of the B-800 SOS, but is designed as a direct connection nozzle for 2½" hose.

No. DB-200 SOS

Your Elkhart representative will gladly tell you more about the advantages of the Dial-A-Tip nozzle. Please write our Sales Department for prompt action.

ELKHART BRASS MFG. CO. INC., ELKHART, INDIANA

The only aerial with load indicator that accurately shows the stress on the beam.*



Seagrave

*In supported and unsupported positions

King-Seagrave Ltd., Woodstock, Ont.

MAIL THIS COUPON

THE SEAGRAVE CORPORATION, COLUMBUS 7, OHIO Please send complete information on:

☐ AERIALS ☐ PUMPERS ☐ CAB-FORWARD ☐ CONVENTIONAL ☐ OTHER_____

NAME_____ TITLE_____

ADDRESS_____

FM-1-61

No.	0 Series: Administration	Price
1-L	Fire Prevention Bureau Ordinance, 1925	$.25
3	Fire Casualty Statistics, 1953	.25
6M	Industrial Establishments, Organization of Fire Safety, 1955	.35
7M	Fire Emergencies, Controlling, 1959	.50

No.	10 Series: Extinguishing Appliances	Price
10	Portable Fire Extinguishers, 1959	.60
11	Foam Systems, 1960	.60
12	Carbon Dioxide Systems, 1957	.75
13	Sprinkler Systems, Installation of, 1960	1.25
13A	Sprinkler Systems, Care, Maintenance, 1958	.50
13L	Automatic Sprinkler Ordinance, 1937	.25
14	Standpipe and Hose Systems, 1952	.50
15	Water Spray Systems, 1957	.50
17	Dry Chemical Systems, 1958	.50
18	Wetting Agents, 1955	.35
182M	Vaporizing Liquid, Hazards of, 1958	.25
19	Motor Fire Apparatus Specifications, 1960	.75
191	Portable Pumping Units, 1959	.35
192	Volunteer Fire Departments, 1958	1.00
193	Ground and Aerial Ladders, 1959	.50
194	Fire Hose Coupling Screw Threads, 1959	.50
196	Fire Hose, 1960	.40
198	Fire Hose, Care, Maintenance, 1958	.50

No.	20 Series: Extinguishing Auxiliaries	Price
20	Centrifugal Fire Pumps, 1960	1.00
21A	Steam Fire Pumps, 1937	.25
22	Water Tanks, 1958	1.00
23	Fire Department Connection for Sprinkler Systems, 1931	.25
24	Outside Protection, 1959	.50
26	Supervision of Valves, 1958	.40
27	Private Fire Brigades, 1955	.35
29C	Fire Hydrants, Private, 1955	.25
291	Fire Hydrants, Uniform Marking, 1935	.25
295M	Forest Fire Equipment, 1956	1.00

No.	30 Series: Flammable Liquids	Price
30	Flammable Liquids Code, 1959	.60
30E	Self-Service Gasoline Stations, 1950	.10
31	Oil Burning Equipment, Installation, 1959	.60
31LA	Oil Burning Equipment, Ordinance, '27	.25
32	Dry Cleaning Plants, 1956	.35
325	Flammable Liquids, Gases and Volatile Solids, Fire Hazard Properties of, 1960	1.50
325A	Flash Point Index, 1959	1.50
326	Warning Labels, Flammable Liquids, '51	.25
327	Cleaning Small Tanks and Containers, '57	.40
328M	Manholes, Sewers, 1956	.25
329M	Underground Tank Leakage, 1959	.50
33	Spray Finishing, 1960	.50
34	Dip Tanks, 1959	.50
36	Solvent Extraction Plants, 1959	.50
37	Combustion Engines and Gas Turbines, 1959	.50
385	Tank Vehicles for Flammable Liquids, '60	.50
393	Gasoline Blow Torches and Plumbers' Furnaces, 1934	.25
395	Farm Storage of Flammable Liquids, 1959	.35

No.	40 Series: Combustible Solids	Price
40	Cellulose Nitrate Motion Picture Film, '53	.50
42	Pyroxylin Plastics in Factories, 1936	.50
43	Pyroxylin Plastics in Warehouses and Stores, 1940	.35
44	Combustible Fibres, 1953	.25
46	Outdoor Storage of Lumber and Timber, 1960	.40
47	Retail Lumber Yards, 1951	.25
48	Magnesium, Storage, Handling, Processing, 1959	.50
481	Titanium, Production, Processing, Handling and Storage, 1959	.50
482M	Zirconium, Production, Processing, Handling and Storage, 1959	.40
49	Common Hazardous Chemicals, 1950	.50
492	Materials Subject to Spontaneous Heating, 1949	.40
493	Mining Products, Spontaneous Heating, 1936	.10
494L	Fireworks Law, Model State, 1949	.25
495	Explosives Code, 1959	.50

No.	50 Series: Gases	Price
51	Welding and Cutting, Gas Systems for, '60	.50
54	Gas Appliances and Piping, 1959	.50
56	Flammable Anesthetics Code, 1960	.50
565	Nonflammable Medical Gas Systems, '58	.50
566	Bulk Oxygen Systems, 1957	.35
574	Fumigation of Grain Storage and Processing Plants, 1939	.35
58	Liquefied Petroleum Gases, 1960	.50
59	Liquefied Petroleum Gas at Utility Plants, 1958	.50

No.	60 Series: Explosive Dusts	Price
60	Pulverized Fuel Systems, 1959	.50
61A	Starch Factories, 1959	.50
61B	Terminal Grain Elevators, 1959	.50
61C	Flour and Feed Mills, 1959	.50
62	Sugar and Cocoa, Pulverizing, 1959	.40
63	Industrial Plants, 1948	.25
64	Country Grain Elevators, 1959	.40
65	Aluminum, Processing and Finishing of, 1959	.40
651	Aluminum Bronze Powder, 1959	.50
652	Magnesium Powder or Dust, 1959	.40
653	Coal Preparation Plants, 1959	.50
654	Plastics Industry, 1959	.50
655	Sulfur Fires and Explosions, 1959	.50
656	Spice Grinding Plants, 1959	.40
657	Confectionery Manufacturing Plants, '59	.40
661	Grain Elevators and Storage Units, 1942	.25

No.		Price
664	Woodworking and Wood Floor Manufacturing Plants, 1960	$.50
68	Explosion Venting, 1954	.75
69	Inerting for Fire and Explosion Prevention, 1956	.50

No.	70 Series: Electrical	Price
70	National Electrical Code, 1959	1.00
71	Central Station Signaling Systems, 1960	.50
72	Proprietary, Auxiliary, and Local Signaling Systems, 1960	.50
72C	Remote Station Signaling Systems, 1960	.50
73	Municipal Fire Alarm Systems, 1960	.50
74M	Home Fire Alarm Systems, 1960	.35
77	Static Electricity, 1950	.50
78	Protection Against Lightning, 1959	.50

No.	80-90 Series: Construction	Price
80	Fire Doors and Windows, 1959	.75
80A	Protection Against Exposure Fires, 1925	.35
81	Fur Storage, Fumigating and Cleaning, '57	.50
82, 82A	Incinerators, Rubbish Handling, 1960	.50
83	Transit Operations, Fire Protection, 1959	.50
86	Class A Ovens and Furnaces, 1950	1.00
87	Piers and Wharves, 1954	.35
88	Garages, 1957	.50
90A	Air Conditioning and Ventilating Systems, 1960	.50
90B	Warm Air Heating and Air Conditioning Systems, 1960	.50
91	Blower and Exhaust Systems, 1949	.50
92	Waterproofing of Floors, Drainage and Scuppers, 1937	.35
93	Dehydrators and Driers, 1954	.35
96	Ventilation Cooking Equipment, 1959	.25
97M	Standard Terms Relating to Chimneys, Gas Vents and Heat Producing Appliances, 1960	.35

No.	100 Series: Safety to Life	Price
101	Building Exits Code, 1960	1.50
102	Places of Outdoor Assembly, 1957	.50

No.	200 Series: Building Construction	Price
211	Chimneys, Flues and Vents, 1957	.50
212	Smoke Pipes and Stove Pipes, 1942	.25
213	Spark Arresters for Chimneys and Stacks, 1936	.35
214	Water Cooling Towers, 1959	.40
220	Building Construction, Standard Types, 1956	.25
223	Fire Protective Construction on the Farm, 1953	.35
224	Homes and Camps in Forested Areas, 1953	.35
231	General Storage, 1956	.35
232	Protection of Records, 1960	1.00
241	Building Construction Operations, 1958	.35
242	Bridges, Safeguarding During Construction, 1937	.25
251	Building Construction and Materials, Fire Tests of, 1960	.50
252	Door Assemblies, Fire Test of, 1958	.40
255	Surface Burning of Building Materials, Test of, 1958	.35
256	Roof Coverings, Tests of, 1958	.50

No.	300 Series: Marine	Price
302	Motor Craft, Fire Protection for, 1960	.50
303	Marinas and Boatyards, 1960	.50
304L	Petroleum Wharves, Ordinance for, 1938	.25
306	Gas Hazards on Vessels, 1960	.50
307	Operation of Marine Terminals, 1951	.25
312	Fire Protection of Vessels, 1951	.15

No.	400 Series: Aviation	Price
402	Aircraft Rescue and Fire Fighting Operating Procedures, 1954	.35
403	Aircraft Rescue and Fire Fighting Services for Airports and Heliports, 1960	1.00
404	Static Electricity in Aircraft Operations and Maintenance, 1960	.40
405	Safeguarding Aircraft Fuel Tank Atmospheres, 1957	.50
406	Aircraft Rescue and Fire Fighting Techniques, Municipal and Rural, 1955	.35
407	Aircraft Fueling on the Ground, 1960	.75
408	Aircraft Hand Fire Extinguishers, 1956	.25
409	Aircraft Hangars, 1960	.75
410A	Aircraft Electrical Maintenance, 1959	.40
410B	Aircraft Oxygen Maintenance, 1959	.50
412	Testing Aircraft Rescue Vehicles, 1960	.50
413M	Aviation Fuels (Ground Handling), Fire Hazard, 1960	.50

No.	500 Series: Ground Transportation	Price
501A	Trailer Courts, 1960	.40
501B	Trailer Coaches, 1952	.35
505	Industrial Trucks, 1957	.50
512	Truck Fire Protection, 1955	.25
513	Motor Freight Terminals, 1959	.40

No.	600 Series: Operating Methods	Price
601	The Watchman, 1956	.35
602	Community Dumps, 1959	.50
604	Salvaging Operations, 1954	.50

No.	700 Series: Classification, Treatment, Materials	Price
701	Flameproofed Textiles, 1951	.35

No.	800 Series: Radioactive Materials	Price
801	Laboratories Handling Radioactive Materials, 1955	.50
802	Nuclear Reactors, 1960	.75

These useful pocket-size Standards have a wealth of up-to-date information for Fire Chiefs, Fire Department Inspectors, and Fire Officers-to-be!

Specially designed for your pocket or desk!

4¾ by 7¼ inches, paper cover.

Complete list of **NFPA PUBLICATIONS** will be sent free at your request.

Order from

NATIONAL FIRE PROTECTION ASSOCIATION

60 Batterymarch Street

Boston 10, Massachusetts

FIREMEN

Volume 28 Number 1

A monthly magazine published for the fire service members of the National Fire Protection Association, 60 Batterymarch Street, Boston 10, Massachusetts.

FIREMEN magazine is available only through membership in the NFPA. Complete details on membership can be obtained by writing to the National Fire Protection Association, 60 Batterymarch Street, Boston 10, Massachusetts.

Highlights of this Issue

	Page
Cavitation in Fire Pumps	8
Barge Fire Is Tough Problem	10
Biggest Little Rodeo City	14
Truck for Grain Fires	16
Making Use of a Dry Hydrant	17
The Tillerman's Job	18
How Contributory Pensions are Taxed	20
This Month's News and New Products	28
Index to Advertisers	28

As this issue goes to press, the world is still shocked by the tragedies that occurred in New York in mid-December. On December 16, 134 persons died following the apparent collision and subsequent crashes of a United Air Lines DC-8 and a Trans World Airlines Constellation. The DC-8 smashed into a heavily built-up section of Brooklyn and the Constellation plunged into an open area of Staten Island. The Brooklyn crash ignited at least eleven multistory buildings. More than 1,000 fire fighters and 100 pieces of apparatus responded to multiple alarms, together with other emergency units of the city. Fire fighting and the search for victims were conducted in bitter cold weather with snow falling.

In Staten Island, little or no fire fighting was needed, since the only fire involved the remnants of the plane. This tragedy, however, necessitated the response of scores of vehicles from the fire department, police and other service units.

Three days later, on December 19, New York fire fighters were called to the burning aircraft carrier *Constellation*. During the next twelve hours, they attempted to gain control of a tremendously difficult fire which spread throughout the $250,000,000 carrier, scheduled to be commissioned early in 1961. This fire also necessitated the response of a considerable number of men and apparatus. Latest reports indicate that 49 construction workmen died in the carrier and hundreds of others, including fire fighters, were burned or injured. One chief officer of the fire department stated that it was the worst fire control problem he had encountered in his years of experience.

The combination of large quantities of flammable liquids, wooden scaffolding and other combustible materials and the intricate maze of divided and undivided spaces throughout the carrier created a fire that was impossible to control without the aid of fixed fire protection equipment, which apparently was not in operation when the fire started.

At this date, it is too early to obtain any authoritative information on either of these tragic incidents. However, the NFPA will publish such information as it becomes available. (*Cover pictures by Wide World Photos*)

Many fire departments fail to sell their services effectively to the public. This came to mind recently when a daily fire record notice in a metropolitan newspaper listed only one fire, thus, perhaps, giving the public the impression that they are paying a lot of people "who only stand and wait."

THE FIRE RECORD

Box	Time P.M.	Loss
3625	2:30—1112 Blue Hill Ave., Dorchester; Jack Levine. Careless disposal of matches.	$500

The facts are something else. During the period covered by the alleged fire record report, the municipal fire department responded to 102 alarms and emergency calls. This required a total of over 500 responses by fire department vehicles and nearly 2,000 "man-runs" in which members of the department risked their lives in responding through traffic and fighting fires.

The breakdown of the figures showed that there were 65 alarms of fire for buildings requiring response of 325 pieces of fire apparatus plus at least one chief's car for each alarm. The average number of officers and men responding was at least 22 or 1,430 "man-runs." In addition, there were 37 still alarms and emergency calls which required an average response of two pieces of apparatus and a chief's car and an average response of 12 men for a total of 111 more vehicle runs and 444 man-runs.

This does not include the fact that suburban fire departments in the area served by the newspaper undoubtedly made far more runs than the department of the central city. The fact that fire department operations were successful so that no fires got out of control and no lives were lost meant "no news" as far as the press was concerned.

The fire service must do a better job in telling the public what it is doing, or it can expect more trouble when the time comes to approve a new budget.

WARREN Y. KIMBALL, Managing Editor; PAUL R. LYONS, Editor; HENRY S. GERE, Advertising Manager; ROWENA D. DORES, Editorial Assistant; SHIRLEY TOBEY, Fire Service Department; VIRGINIA STILES, Advertising Department.

New impeller before it was subjected to the damage of cavitation.

CAVITATION IN FIRE PUMPS

by Richard B. Sargent
Hale Fire Pump Company, Conshohocken, Pennsylvania
Member, NFPA Committee on Fire Department Equipment

IN ANY fire pump pronounced cavitation can be destructive. We should therefore study the principles of cavitation and learn to recognize when a pump is cavitating. Cavitation can occur in pumps of all types, sizes and designs, but it is difficult to define in a few words.

Webster's dictionary has this definition:

"Cavitation — The formation of a vacuum around a propeller or fan, revolving at a speed above a certain critical value."

As usual, Webster is right, but his definition is too brief for our use. Now let us read what another authority has to say about cavitation:

Church * Page 73 — "If the pressure at any point inside a pump drops below the vapor pressure corresponding to the temperature of the liquid, the liquid will vaporize and form cavities of vapor. The vapor bubbles are carried along with the stream until a region of higher pressure is reached when they collapse or implode with a tremendous shock on the adjacent walls. This phenomenon is called cavitation."

Cavitation in fire pumps is caused by reducing the absolute pressure on the water below the water boiling point. It occurs at the point of lowest pressure, that is, highest vacuum, which is usually at the impeller eye in back of the leading edge of the impeller blade. The temperature at which water boils varies with the absolute pressure, as shown by the following table:

Water Boils at Temp. Degrees F	when under	Absolute Pressure Pounds per Sq. In.	Corres. Vacuum Inches Mercury
101.83		1	27.88
126.15		2	25.85
153.01		4	21.78
170.06		6	17.73
182.86		8	13.64
193.22		10	9.57
201.96		12	5.50
209.55		14	1.87
212.00	Atmospheric	14.7	0

*Centrifugal Pumps and Blowers. John Wiley & Sons, New York.

There is always atmospheric pressure on the surface of the earth, land and water, caused by the weight of the atmosphere above us. Atmospheric pressure is higher at Death Valley below sea level, and lower at high altitudes. And it changes with the weather. ("The barometer reads so much today.") Normal atmospheric pressure at sea level is 29.92 inches of mercury, 14.7 pounds per square inch or approximately 34 feet of water.

When a pump is cavitating, water in the fire pump suction flashes into steam, or water vapor which is the same thing. The bubbles of water vapor may be as large or larger than a cubic inch, but normally there are thousands of small bubbles, resulting in a mixture of water and water vapor. As the mixture flows through the impeller there is a rapid, almost instantaneous change from a vacuum to substantial pressure. The vapor instantly condenses under the higher pressure and water rushes in at high velocity to fill the void. Suddenly the bubble is full, and the inertia of the water having filled the bubble at high velocity produces an intense shock. This shock strikes the walls surrounding the water with a forceful impact and can cause severe damage to the metal, especially if continued for too long a time.

Cavitation will damage piston and rotary pumps more rapidly than centrifugals, because the increase in absolute pressure on the water passing from a vacuum to 120 or more pounds per square inch is almost instantaneous. In a centrifugal pump the pressure rise is more gradual.

Conditions Creating Cavitation

Pressure is reduced, and conversely vacuum is increased, on the water within the suction of the pump by excessive lift, too small or too long a suction hose, a blocked or inadequate suction strainer, by pumping abnormally warm water, by pumping at low atmospheric pressure (high altitude) and frequently by a combination of several of these conditions, all of which tend to produce cavitation.

Let us evaluate some of these factors in a specific example. Assume the lift to be 12 feet, altitude 2,000 feet above sea level, a 30-foot suction hose of 4½-inch diameter, with barometric pressure at 27.9 inches of mercury (normal for this altitude) or 31.6 feet of water, the water temperature 100 degrees Fahrenheit and the desired volume 809 gpm at 150 psi.

Will the pump reach this volume or will cavitation interfere? The pump will reach the volume if we do not have too many pressure losses between the water and the suction of the pump. Let us see what these losses are. (Pressures are in feet of water.)

First, the atmospheric pressure must force the water through the strainer. This should require not more than .3 psi or .69 of a foot head.

Will you help NFPA in its continual study of fire?

The National Fire Protection Association is known worldwide for its valuable studies and analyses of all types of fires.

The information concerning fire which NFPA publishes year after year is made possible through the cooperation of many members of the Association. Among these members are thousands of municipal fire chiefs of paid, call and volunteer fire departments who answer inquiries of the NFPA Fire Record Department and supply the necessary details and illustrations concerning individual fires.

Each year, certain fire lessons and statistics are compiled from these fire reports. Some are passed on to appropriate technical committees of the Association so that improvement may be made in fire protection standards. Other information is compiled in such well-known studies as *Fires and Fire Losses Classified*, *Large Loss of Life Fires*, *Large Loss Fires*, and the 33 illustrated booklets titled *Occupancy Fire Records*. From time to time, detailed reports of fires are published in the NFPA *Quarterly* or NFPA FIREMEN magazine. Every month, summaries of fire reports appear in NFPA *Fire News*.

With this issue of FIREMEN magazine, we enclose the general fire report form used by the Association. Other fire report forms occasionally used for special information cover: buildings having automatic fire alarms, sprinklered properties, motor vehicles, motor craft, fire resulting in casualty, and fires involving such special problems as electric blankets, domestic type clothes driers and automatically-fired forced warm air heating systems.

The Association is looking for reports on "interesting" fires, such as the following:

Fires causing loss of life

Fires causing over $100,000 damage

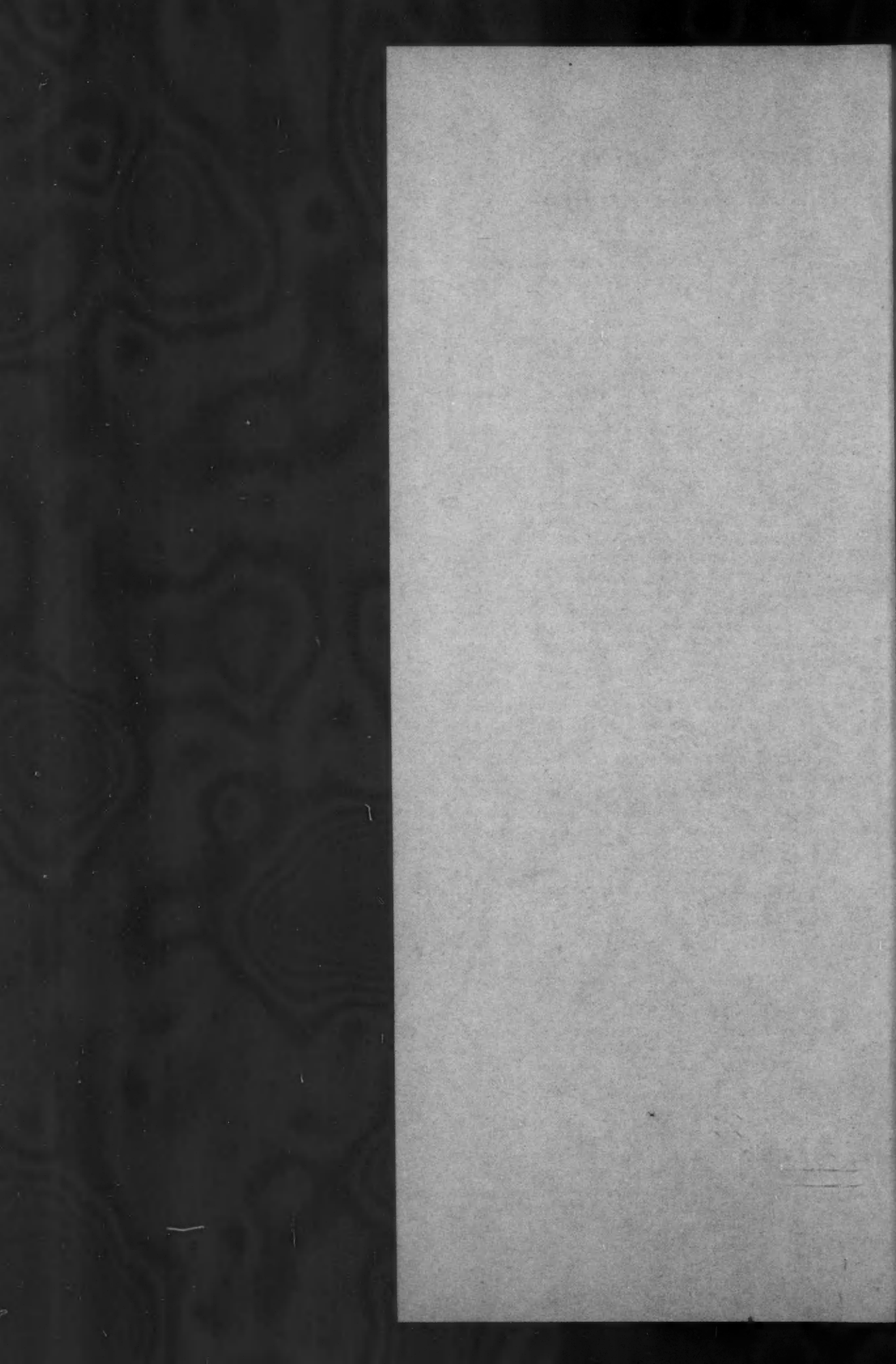
Any fire in which a fire protection device (sprinklers, alarms, fire wall, fire door, fire retardant paint, etc.,) was helpful in protecting life and property

Any fire in which a fire protection device failed

Any fire in which a building material (plastic, fiberboard, cement, plaster, or steel) was a major factor in fire spread or lack of fire spread

Any fire caused by a particular device or machine

You can help by sending in one of these filled out forms if such a fire occurs in your community. Be sure to include details of the information requested on the back of each report. Additional copies of this and the other forms mentioned can be obtained free by writing to the NFPA Fire Record Department, 60 Batterymarch Street, Boston 10, Mass.



Same impeller after severely cavitating for an extended period. The front disc and vanes have completely separated from the hub and rear disc due to billions of implosions.

While it is true that the strainer is submerged and has some water head on it, this submergence head is exactly balanced by the water column in the suction hose from the strainer to the water level.

Secondly, pressure is required to accelerate the water from zero velocity to the velocity in the suction hose. This velocity will be 16.1 feet per second and the pressure required will be 4.03 feet of head. This velocity head would be largely recovered on an end suction pump, but very little if any is recovered on a midship fire pump, which is of cross suction design.

The friction loss at 800 gpm flow through 30 feet of 4½-inch diameter suction hose in good condition will be approximately 5.64 feet of head.

The water is warmer than normal, so a slight correction must be made. If we assume a water temperature of 60 degrees F. as being standard, in this pumping situation there will be a loss of approximately 1.6 feet at 100 degrees F.

Finally, we have the lift of 12 feet of water.

Summing up these losses:

Strainer	.69 head, feet of water
Velocity in suction hose	4.03
Suction hose friction loss	5.64
Temperature correction	1.60
Lift	12.00
Total loss	23.96 feet of water

Most fire apparatus pump manufacturers test each pump model carefully to find out where cavitation starts. If we select a representative 750 gpm, 2-stage series-parallel pump, we find that at 800 gpm, 150 psi, the maximum vacuum the pump will reach in feet of water is 22.7.

Since this is less than the 23.96-inch vacuum required to pump the 800 gpm from this suction layout, the pump will not deliver this volume. Attempting to do so results in pronounced cavitation.

Alternatives are to reduce the pressure to get slightly less volume, or use slightly smaller nozzle tips to get slightly less volume at the same pressure. This same pump under these lift conditions would deliver approximately 725 gpm without cavitation. Other alternatives are to move the pump closer to the water source, so only two lengths of suction hose are required, or to go to another location which requires only an eight- or ten-foot lift. A suction hose of 5-inch diameter with strainer and adapters would also allow the pump to reach the 800 gpm.

Operate to Avoid Cavitation

A reliable way to determine the cavitation point of a fire apparatus pump under any suction condition is to open the throttle gradually (always good practice) watching the engine tachometer and the pressure gauge. AN INCREASE IN ENGINE RPM WITHOUT A CORRESPONDING INCREASE IN PRESSURE INDICATES CAVITATION. (We assume the clutch is not slipping.) Nothing is to be gained by running at a higher rpm. Cavitation will be more severe and no more water will be put on the fire. The pump is said to be "running away from the water."

Most compound gauges are difficult to read and are often inaccurate on the vacuum scale. The experienced operator can judge when the pump is approaching cavitation by watching the compound gauge. A better way is to observe the point at which speed increases without an increase in pressure.

Hard suction hose (noncollapsible under vacuum) must be used when pumping from draft. Soft suction has an advantage when pumping from hydrants. Fire pumpers occasionally have capacity to pump more water than a hydrant will supply. Under this condition the pump can cavitate. Soft suction will collapse under vacuum and will thus indicate that the hydrant can supply no more water, and that the pump is cavitating or is approaching cavitation. CAVITATION WHEN PUMPING FROM A HYDRANT IS NOT UNCOMMON.

One fire apparatus pump manufacturer produces a centrifugal priming trainer pump for fire colleges and instructors. This pump has transparent plastic suction and discharge hose and a transparent cover over the impeller. In addition to showing the methods by which a centrifugal may be primed, cavitation can also be shown. The suction tube can be clamped to almost shut off and cavitation can be seen in the form of a stream of small bubbles entering the pump, where they collapse and eventually damage the impeller.

At one demonstration the question was asked, "Where do the air bubbles come from?" (No bubbles were visible in the plastic suction tube ahead of the clamp.)

Since there is always some air dissolved in water, a small percentage of the total bubble volume may have been air, but the bubbles were mostly water vapor, and they collapse and disappear upon entering a higher pressure within the impeller. Continued running under these conditions would eventually damage the impeller, even though this small priming trainer pumps at low pressure.

Cavitation is usually more severe at high pump pressures than at low pressures. It is possible to damage a fire pump seriously by trying to pump more water from the booster tank than will flow into the pump through the booster piping. This would be especially severe if the pump were operating at 250 psi or higher pressure.

In conclusion let us remember that cavitation will gradually damage a fire pump. TO AVOID CAVITATION, ENGINE AND PUMP SPEED SHOULD NOT BE INCREASED BEYOND THAT SPEED AT WHICH PUMP PRESSURE CEASES TO RISE.

Fire fighters use four 1½-inch lines with fog nozzles to sweep away flammable liquid fires between barges. These lines were taken from a wye connection (bottom, center) attached to a 3-inch supply line stretched down cliff to repair barge.

BARGE FIRE IS TOUGH PROBLEM

From a report by Chief Charles Roth, Jr., of The Dalles, Oregon, Fire Department

On October 11, 1960, the fire department of The Dalles, Oregon, handled a serious fire control problem on the water front. At mid-morning of that day, explosion and fire involved a combination tank and dry cargo barge in a shipyard repair facility of a navigation company. The techniques used by the fire department reflect good planning and teamwork and deserve study and consideration by other fire departments which have water-front areas and facilities to protect.

ON OCTOBER 11, explosion and fire involved a combination tank and dry cargo barge docked at a shipyard repair facility in The Dalles, Oregon. This area includes a two-story warehouse and office building of frame construction, shipways, floating dry dock, welding shop, a steam derrick barge, and a railroad crane, all on the West Columbia River water front within the city limits.

The barge was a rebuilt U.S. Navy YF 721 originally designed to carry only dry cargo. The over-all length was 259 feet, 6 inches; width, 48 feet, and depth, 10 feet 6 inches. Tank capacity was 20,719 barrels and the barge was rated at 2,529 net tons.

It had been rebuilt into a combination carrier several years ago, and the hull was compartmented into 13 tanks. All except the bow tank and stern tank were surrounded on the sides and bottom by a void space created by double bottom construction. Piping and valves for filling, discharging, and venting the liquid cargo tanks were installed during the rebuilding process along with a diesel pump located on the stern deck for discharging the cargo.

On Saturday, October 1, Barge No. 510 arrived in The Dalles from Coos Bay for routine maintenance and repairs. Blowers were set up on the various tank and double-bottom manholes and gas-freeing operations were begun.

On Monday, October 3, the actual washing of the tanks and double-bottom void spaces was started, and this continued until about 1700 on Thursday, October 6. During this time, the barge was tied up alongside the floating dry dock so the pumped-out waste from the tanks and bilges would be carried downstream by the river current. The barge was then certified by the construction superintendent as being gas-free and was also certified by the Coast Guard representative present, who issued a certificate.

Friday morning, October 7, routine scheduled maintenance and repair work started. The barge had now been moved from alongside the floating dry dock to a position alongside a derrick barge and repair barge No. 524.

Maintenance and repair work included replacement of some exterior electric cable and testing of overhauled electric windlass motor and controller, installation of grease fittings on the control pedestals that operate valves in the bottom of the various tanks, and numerous other items of repair. This work also included welding operations which continued from October 7 up to the moment of the explosion and fire at 1024 on October 11.

NFPA Standard No. 306 — "Control of Gas Hazards on Vessels to be Repaired" contains important recommendations on this subject. It specifies that, before repair work or alterations to a vessel are started, an inspection must be made by a "Certificated Gas Chemist" who then issues a certificate stating what repairs and alterations can be undertaken with safety. His certification "is based on

conditions existing at the time the inspection . . . was completed." It is not the intent of the standard that such certification would permit repair work to start several days later (as in the incident at The Dalles) without reinspection and certification.

The Explosion and Fire

The day of the disaster, a man was assigned to weld some ⅛-inch pipe couplings to the top bushings on valve control pedestals located on the side deck of the barge. These couplings were to permit the installation of grease fittings at this point for lubricating the valve rod bearing. This welder went forward on the starboard side of the barge to the control pedestal near the manhole entrance to No. 2 tank and the manhole to the double bottom void space, both of which had their covers off.

Electricians were working in the bow section. The exact position of these men at the time of the explosion is not known. As near as can be determined by our investigator, the man was welding the ⅛-inch pipe coupling to the forward control pedestal on the starboard side by Tank No. 2 open manhole and the void space manhole adjacent to it. One of the electricians was on the starboard bow nearby. The arc struck by the welder is assumed to be the initiator of the explosion that followed.

The blast rocked the entire city of The Dalles.

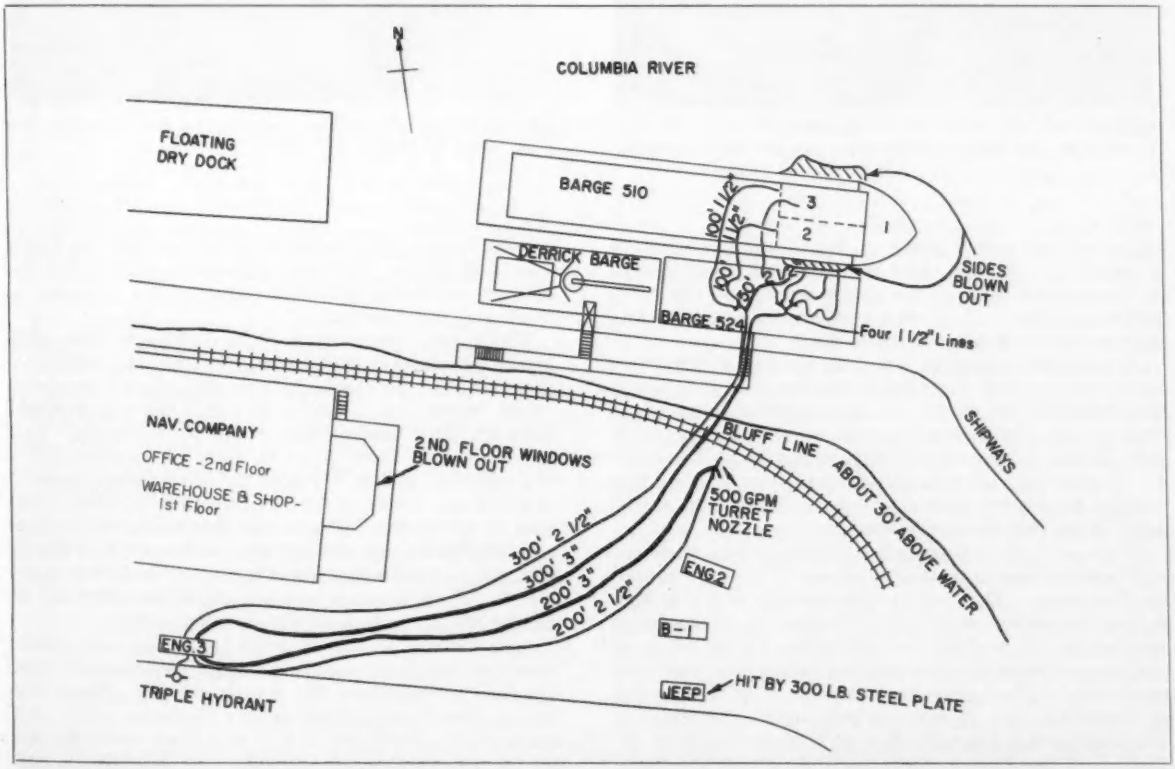
The explosion blew the welder from his position across to the repair barge No. 524 where he landed on the deck fatally wounded. He died in a local hospital about one hour later. The electrician was either blown, or jumped, into the river between Barges No. 510 and No. 524. He was reported to be seen swimming in the flaming gasoline fire that immediately followed this blast, but six days later his body still had not been found.

This city-shaking blast presaged the alarm of fire received by The Dalles Fire Department from the shipyard office which requested an ambulance and fire fighting units. The department responded with the first alarm assignment for this box which consists of Engine 3, a 1,250 gpm pumper; Engine 2, a 600 gpm pumper and a 75 gpm booster truck which is the fire chief's vehicle. Fifteen paid firemen and thirty volunteers responded on this alarm. The department's ambulance arrived with the apparatus and immediately loaded the injured man, who had been brought up from the deck of the repair barge.

The fire department officer-in-charge found Barge No. 510 burning fiercely in the forward part, and the barge had already started to sink at the bow end. Gasoline-fed flames were leaping high out of the blown-off hatch covers over the dry cargo space above Tanks 2 and 3, and large columns of flame and black smoke were coming from the blown-out sides of the hull by Tank No. 2 and Tank No. 3.

An opening ripped by the explosion on the starboard side was about 35 feet long and nearly 8 feet deep, and a similar opening on the port side was about 45 feet long and about the same depth. A serious gasoline fire burning on the water between Barge No. 510 and the repair barge No. 524 was threatening the wooden-hulled derrick barge. The floating dry dock, about 75 feet downstream from the stern of Barge No. 510, had the tug *Inland Chief* on the blocks at the time.

It was also noted that the explosion had broken most of the plate-glass windows on the second floor of the

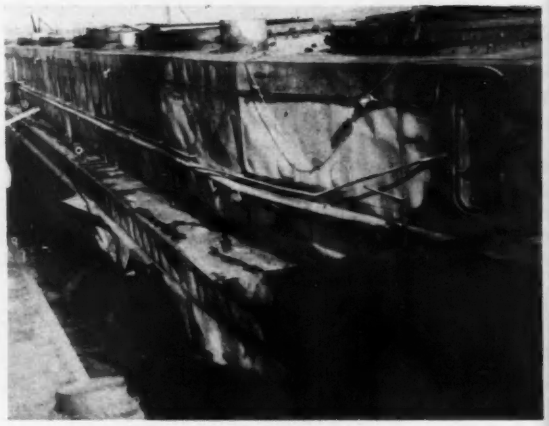


General sketch of fireground layout (not to scale). The 500 gpm turret nozzle provided initial protection for men moving down cliff for attack with hand lines. Jeep hit by steel plate was more than 100 yards away from Barge No. 510.

This intense fire on the barge and in the water greeted first responding fire fighters who had to move down steep cliff to make a close attack.

A portable monitor with a 500 gpm nozzle lobbed this fog stream onto water and barge to cool approach for fire fighters. The monitor was fed by 3- and 2½-inch lines.

Another view of attack by fire fighters on Barge No. 524. This photo was taken shortly after the picture on page 10.



The explosion ripped large openings on the starboard and port sides of Barge No. 510.

office and warehouse building, but it was not afire. A piece of ½-inch steel plate from the hull was reported to have blown through the air for more than 100 yards striking a jeep parked on a roadway in the yard and causing severe damage to the vehicle.

Since it was apparent immediately that this fire was being fed by a low flash-point flammable liquid (which was undoubtedly gasoline) in considerable volume, and that access down over the cliff to the fire was very difficult and perilous for firemen, it was decided to cover the men as they advanced lines on the fire with a water curtain from a 500 gpm fog turret nozzle set up on the edge of the cliff above the river.

Engine 3 made a parallel lay-in from this point to the hydrant just south of the warehouse building and tied in the pump. This turret was started and the high caliber fog stream was directed to the top of the barge deckhouse. It produced a noticeable cooling effect as well as providing the cover for the firemen who were now stretching a 3-inch line down over the cliff to the deck of Barge No. 524. A wye was put on this line and four 1½-inch lines fitted with 90 gpm fog nozzles were attached. These lines were first used to sweep the burning gasoline away from between Barges No. 510 and No. 524 where the water-borne fire was threatening the derrick barge. They were then directed into the blown open hull on the starboard side of Barge No. 510 and had an immediate effect in reducing the intensity of the fire at this position.

The hatch covers on top of the deckhouse were starting to burn and it was feared that the fire would progress aft through the deckhouse and involve the entire vessel. Accordingly, another 2½-inch line was stretched from Engine 2 hosebed and a wye was attached. Two more 1½-inch lines with 90 gpm fog nozzles and a 2½-inch line with a 170 gpm fog nozzle were attached to this wye. Three of the 1½-inch lines were stretched over to Barge No. 510 and topsides where fog streams were directed down through the blown-off hatch covers into the dry cargo space over ruptured Tanks No. 2 and No. 3. These streams had an immediate effect on reducing the magnitude of the deckhouse fire.

Just about 1115 the adjacent tanks and void spaces were entered by our men and a search was made for any trapped workers and for remaining fire. None was found. The fire continued to burn, however, in the tank space of No. 2 tank and No. 3, so a foam operation was set up and mechanical foam directed into No. 2 tank from the stern deck of a small tug that we had ordered in between the two barges. About 8,000 gallons of foam

produced in this operation extinguished the remaining fire. The engineer of Engine No. 3 was ordered to shut down his pumper at 1135 after pumping since 1030.

A thorough search was then made of the vessel to inspect the damage and try to determine the source of the gasoline that fed this fire for more than one hour in a supposedly gas-free barge.

At the peak demand, Engine No. 3 supplied 1,210 gpm to eight separate fog streams. Hydrant static pressure at the start was 75 psi and it dropped to 10 psi when all lines were being operated including the turret nozzle. The value of a large capacity pumper spotted near the fire on a first alarm cannot be overemphasized. The engine was connected to a hydrant on a dead-end 6-inch main located about 1,500 feet from a 12-inch grid point. Had any additional lines been required on this fire we would have been outclassed.

Chief Roth's Conclusions and Recommendations

1. The source of ignition of this explosion and resultant fire has not been absolutely established. It is assumed from evidence that the electric welding arc struck by the welder ignited vapors coming from the void space manhole near Tank No. 2.

2. The fire burned for about 65 minutes after the initial explosion. It was definitely fed by gasoline inasmuch as waterfog in high volume had little or no effect on extinguishment. This indicates a low flash-point fuel such as gasoline. The strategy of using waterfog to keep adjacent tanks cool, protect adjacent exposures and reduce damage to structural steel members proved effective and correct.

3. Subsequent investigation failed to reveal the source of the released gasoline from this certified gas-free vessel.

4. The use of double bottom vessels for Class I flammable liquid cargoes poses almost insurmountable problems in gas-freeing due to the difficulties in completely washing out all traces of residual gasoline that invariably leaks into the voids. Hull dents in the bottom due to grounding and other minor damage is almost sure to leave depressed places that will defy the best efforts of even conscientious workmen to wash out. This is due to the inaccessibility of these void spaces.

In my opinion, this explosion occurred in the double bottom void under and around Tanks No. 2 and No. 3 as is evidenced by the blown-out outer hull plates and the blown-in tank sides. The fatal explosion at the Albina Yard at Swan Island last January in this same vessel may have been caused by the same set of circumstances.

This appears to me to be an inherent hazard in any flammable liquid vessel having a double bottom construction. It would therefore be prudent to discontinue using this type of vessel for flammable liquid cargoes.

5. Continuous ventilation and monitoring by a skilled operator of a combustible gas detector should be the rule rather than the exception around petroleum vessels whenever hot-work is being done.

6. Early measures should be taken to complete the gridding of the present dead-end 6-inch water main supplying the fire protection for this vulnerable plant. This has been recommended in the past.

7. This fire is the sixth since 1944 where a major fire department operation was required over the sides of the rocky cliff to vessels involved below. The task of stretching lines over this terrain is difficult and dangerous at the best. Sometimes it has been done under severe ice and snow conditions.

We recommend the installation of a 6-inch manifold pipeline running horizontally along the lower level and fitted with duplex gated 2½-inch fire hose outlets opposite the gangways to the dry dock, repair barge, etc., and a riser attached to this manifold running to the top of the rocky cliff and then ashore where it would be fitted with a three-way siamese inlet. This arrangement would enable the fire department to charge this manifold with a pumper.

Firemen could then stretch hose lines to the water front and connect to the outlets provided on the manifold. This would make for a much faster and convenient operation and it is therefore recommended that serious consideration be given this by the management.

8. The practice of allowing all kinds of debris, scrap steel and other items to obstruct fire department access to fire hydrants should be discontinued at once. On the day of this last fire, it was necessary for our first alarm pumper to drive over all sorts of debris and scrap items to locate alongside the hydrant south of the warehouse building. Had it been necessary to use the hydrant by the shipways, it would have been inaccessible due to a large, heavy metal screen device which was placed against the guard posts effectively blocking off the hydrant.

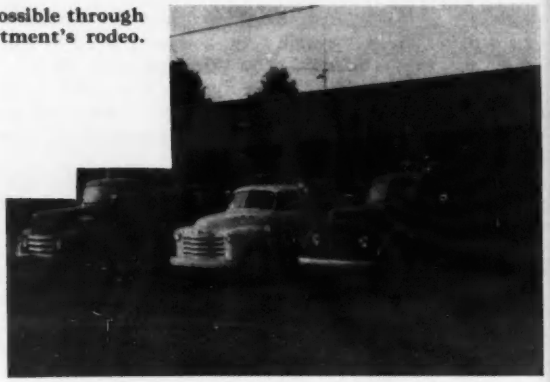
On another inspection of the yard, a metal deckhouse was found placed directly on top of the hydrant. It is also recommended that housekeeping conditions throughout the yard should be drastically improved in the interest of fire safety.

New Pumper for Volunteers

CHIEF Roland E. Camann, who heads the First Volunteer Fire Co. of Bergholz, Inc., Niagara Falls, New York, reports that he has just put this new American LaFrance 1,000 gpm pumper in service. Powered by a 275 horsepower engine, it features a 750-gallon booster tank and a hose bed for carrying 200 feet of preconnected 1½-inch line, 1,200 feet of 2½-inch and 600 feet of 1½-inch hose. There are also two electric rewind booster reels, each with 200 feet of 1-inch booster hose. All nozzles are of the "Imperial" type made by Akron Brass Manufacturing Company. One 1½-inch nozzle has fittings for a bayonet piercing applicator and a low velocity extension applicator.

An Akron by-pass eductor is installed behind the pump control panel for discharging wet water or foam through the rear preconnected 1½-inch line. A 20-gallon fiberglass foam tank is located between the booster reels. The pump control panel features individual pressure gages for the four 2½-inch discharge connections and the 1½-inch rear discharge. The pumper also carries a 35-foot three-section extension ladder, and a 14-foot aluminum roof ladder. Mounted on the cab roof, ahead of the Sireno light, is a three-way "Penetrator" electronic siren which also serves as a public address system and radio amplifier. Two 2½-inch gated suction inlets and a "no-spin" differential are also featured.

New fire hall and equipment were made possible through funds raised by the volunteer fire department's rodeo.



"BIGGEST LITTLE RODEO CITY"

by Robert Dyment

Volunteers operate profitable rodeo each year to raise funds for apparatus and equipment.

THE summer of 1960 marked the 16th year that famous cowboys, cowgirls, horses and cattle arrived in the small Chautauqua County farming town of Gerry, north of Jamestown, New York. They came for the annual rodeo sponsored by the Gerry Volunteer Fire Department — one of the few fire departments in the United States which operates and maintains its own rodeo city. Gerry is approximately 60 miles southwest of Buffalo.

Back in 1944, the fire department, now 60 men strong, took a gamble that a rodeo would prove successful. Before the first rodeo was even held, the Gerry Volunteer Fire Department, organized only two years earlier in 1942, had gone in debt for approximately $14,000 constructing an arena and other necessary buildings on three acres of land. It was appropriately called "Rodeo City." However, so well attended was the first rodeo, that the volunteers were able to pay all bills and still retain a small profit from the operation.

Howard Samuelson, president of the Gerry Volunteer Fire Department, points to Rodeo City, built and owned by the firemen.

From rodeo funds received throughout the past 16 years, the Gerry Volunteer Fire Department has been able to build an up-to-date three-bay fire station and to purchase a 1,000 gpm pumper, a John Bean high pressure truck and a 2,000 gallon tank truck. There are no hydrants in the town of Gerry.

The idea for the department's rodeo originated with Jack Cox, then a member of the organization. During a visit to Madison Square Garden in New York City, he approached a rodeo manager, discussing what it might take in the way of funds and facilities to sponsor a rodeo in Gerry. The department members became enthused about a rodeo event in their own area. A committee from the Gerry volunteers was appointed, traveling to Cleveland where a rodeo was then playing. A contract was signed for a show.

The newly organized fire department then had a lot of work to do. Bulldozers, trucks and earthmoving equipment were employed to level the three acres of land on which Rodeo City was to be constructed. Surplus army seats were purchased in Meadville, Pa., and erected bleachers were secured from area high schools and the Chautauqua County Fair. These were disassembled by the firemen and trucked to Gerry where they were erected before the opening of the rodeo. Firemen and other volunteer labor from the community often worked until 2 o'clock in the morning building Rodeo City. After the rodeo, all the bleachers had to be returned to the schools and Fair. In appreciation, the department gave many free passes to school board officials for allowing the fire fighters to utilize the seats. The following year the volunteers purchased their own bleachers at a cost of $10,000.

For financial acceptance, the fire fighters had the backing of Ray Keller, formerly of Fredonia, N. Y., who admired the sporting chance the men were taking in planning a rodeo — a rodeo that no one knew if the public would accept. Mr. Keller said he would stand behind the men should the rodeo fail.

After the successful first year, when more than 25,000 people from New York and Pennsylvania came during the week to view the rodeo, it was easier for the department to obtain financial backing to improve the rodeo grounds and construct additional facilities. An arena for seating 4,500 was constructed and a lighting system totaling 40,000 watts installed. Attendance has averaged between 20,000 and 25,000 for each of the past 16 years.

Starting June 1, members of the Gerry Volunteer Fire Department spend each Monday evening painting, fixing and repairing. All evenings during the week just prior to the opening are spent by volunteers at Rodeo City for final readiness. The rodeo is usually held during the first week of August and is the only fund-raising event that the firemen sponsor.

Foy Reynolds Rocking R. Ranch Rodeo of Florida was the feature attraction in 1960. The department must guarantee the attraction a fixed price, and supply thousands of dollars in prize money. When rodeo week is over, the Gerry Volunteer Fire organization usually has a profit of between four and five thousand dollars — all of which goes towards fire-fighting equipment.

The rodeo starts each evening at 8:30 and lasts approximately 2 hours with a ten-minute intermission, allowing the public to obtain refreshments from several stands owned and operated by the firemen and Ladies' Auxiliary. A few of the events are bulldogging, calf roping, steer wrestling and saddle bronc riding. The animals consume two tons of hay daily, plus ½ ton of oats, all supplied by the fire department.

Bar BQ dinners are served by the Gerry Volunteer Fire Department's Ladies' Auxiliary in a wire-enclosed dining room. The meat is prepared over hard wood coals early in the morning, basted often during the day and is ready to serve at 5 o'clock each evening and 1 p.m. on Saturday and Sunday when matinees are held. Prices are $1.25 for adults and 75¢ for children. The meal, in addition to the meat, includes boiled potatoes, salad, bread, butter, coffee, milk or orange drink and ice cream. Many town of Gerry residents, who do not belong to the fire department, pitch in and help the firemen and Ladies' Auxiliary serve the meals. No alcoholic beverages are served.

The rodeo itself consists of five contests. The cowboy wishing to participate pays a fee of $10 and $15 to enter and must belong to the Rodeo Cowboys' Association before he can ride. This Association carries insurance in case the cowboy becomes injured. A first-aid building, with a registered nurse in attendance, is always available to treat the public or contestant.

Monday is Firemen's Day when uniformed firemen and auxiliary are admitted free. Prizes are given for the largest company, largest auxiliary and company coming the longest distance. Tuesday is children's night, at which time children under 12 years old are admitted for 30¢. Many service groups bring children from orphanages. They are welcomed and admitted free by the fire department.

All range and arena posts are set in concrete and a double cable and wire protects the public. Wild steer and range horses strike the fences with terrific speed, adding to the thrills and chills.

Many months before the opening of the rodeo, a 15-man committee is chosen by the 60-man force to head up and organize the year's rodeo activities. It is the responsibility of the committee to collate all items relating to the rodeo. Work committees are assigned to other members and all have a job to do both before, during and after the rodeo is completed.

No advance tickets are sold. Tickets are a different color for each day the rodeo is in operation. General admission is $1.40, while reserved seats are $2.50.

Two weeks prior to opening night, the Gerry Volunteer Fire Departments' rodeo crew goes out and places posters relating to the events within a 35-mile radius of Gerry. The firemen also donate a beautiful horse as a prize.

The Gerry firemen found a real friend in Frank Hyde, Sports Editor of the nearby Jamestown *Post-Journal*, the county's largest daily. Mr. Hyde, a former westerner, assisted the group, explaining to the public that this was a real rodeo. Throughout the years, he has continued to feature outstanding publicity about the rodeo in his newspaper. Many other newspapers and radio stations have given the firemen fine cooperation in coverage.

A group of volunteer firemen from Falconer, N. Y. Firemen's night draws hundreds of various volunteer departments to the rodeo.

Howard Samuelson is president of the Gerry Volunteer Fire Department and for eight years was Fire Chief. Currently, Richard Bedient is Chief, while Earl LaDow is 1st Assistant Chief. Victor Shepardson and Howard Johnson are 2nd and 3rd Assistant Chiefs.

Judges' stand at the Gerry rodeo.

Truck for

GRAIN FIRES

A PARTICULARLY difficult type of fire to control develops when a large field of standing grain is swept by fast-spreading flames. Fire departments in certain portions of the United States and Canada, where these fires are apt to occur, must develop special techniques of fire control or perhaps purchase and equip special apparatus to fit the situation.

A field of ripe grain makes a very hot running fire, but, once the fire has passed, the burned area is not too warm. Consequently, fire departments used to handling these fires, generally operate pumpers in motion from the inside or blacked out area. This position minimizes the danger to vehicles and men in case of a change in wind direction.

A flanking attack from the inside seems to be the safest and most effective way of handling a grain fire. Two or three vehicles, able to pump water while in motion, move along the flanks of the burned area, and men standing on the vehicles direct hose streams into the grain. Grain fires give off a lot of smoke and prearranged audible signals and radio communications are necessary for chief officers to maintain continual contact and coordination.

In one popular method of attack, three pieces of apparatus are used. Two operate "in tandem" on the windward flank of the fire. The first moves as close as possible to the burning grain to knock down the main fire and sweep the burning embers on the ground. The second vehicle operates about 100 feet behind the first, closer to the perimeter of the fire, to extinguish the flank. These vehicles are followed by at least two firemen on foot who use shovels, pump tanks and wet sacks to mop up remaining small fires and embers.

The third vehicle attacks the fire on the lee side, operating either in the burned area or in the unburned grain. If either of the first two trucks runs out of water, the third truck moves over to take its place in the tandem operation. Usually, "nurse" tankers are close by to replenish booster tanks in the pumpers.

Chief Johnny Jilg, of Walla Walla County Fire Protection District No. 4, in Washington, has sent a picture and description of one of the vehicles used by his department for handling grain fires. This features four-wheel drive, a 240 horsepower engine, a midship pump, booster tank and a portable pump mounted behind the booster reels. In the hilly grain fields of Washington, fire departments prefer to operate portable pumps for supplying hose streams while the vehicle is in motion rather than relying on power take-off pumps in areas where the full power of the engine is needed to move the vehicle over soft ground or steep terrain.

Chief Jilg reports that the nozzlemen in his department used to ride the fenders or behind the cab, but since this proved unsafe, platforms and seats have been installed on three of the trucks, as shown in the photo. The seats, taken from old grain mowers, can be raised, lowered, or turned in any direction. Each seat is bolted to a 1½-inch pipe which slides down inside a 2-inch pipe welded to a four-legged frame. Safety belts, foot rests and a "cross over" bar have also been installed. The bar permits the nozzleman to move from one side of the vehicle to the other and still have some form of protection if the vehicle runs into a ditch or farm machinery in the dense smoke.

All fire fighters wear complete turnout clothing, helmets, and wool gloves during the attack on a grain fire. Chief Jilg also states that he is contemplating the purchase of "crash-type hoods" to protect the faces of nozzlemen, and he is also considering the possibility of piping fresh air to both nozzlemen and drivers.

On the vehicle shown, two short 1-inch lines and a 1½-inch line are used for grain fire attack. Chief Jilg's department has found that the 50 gpm output from 1½-inch nozzles gives quicker results than smaller nozzles at higher pressure. He states "We used the 1½-inch nozzles the last two years and have found that we have less grain loss, less time in the field due to 'break outs,' less water used and it is easier on the men."

He also mentions that electric starters have been installed on some of the portable pumping units and that this is an improvement over the pull rope type of starting. The portable pumps are fixed on the beds of the apparatus, but on one vehicle with 6 x 6 wheel drive, a portable pump is installed in the rear compartment operating from the tank to supply the short lines. However, it can be removed quickly to draft water from sources inaccessible to larger equipment.

Another feature of the apparatus used for grain fires is the exhaust pipe shown directly behind the cab of the vehicle in the photo. A spark arresting screen is installed on the end of this pipe to minimize the danger of fire starting in grain by hot carbon particles coming from the exhaust.

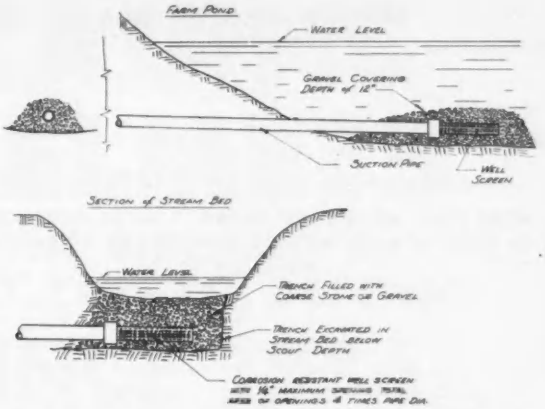
IRFAA Officers

THE International Rescue and First Aid Association elected a new slate of officers at the 13th Annual Convention at Philadelphia, Pennsylvania.

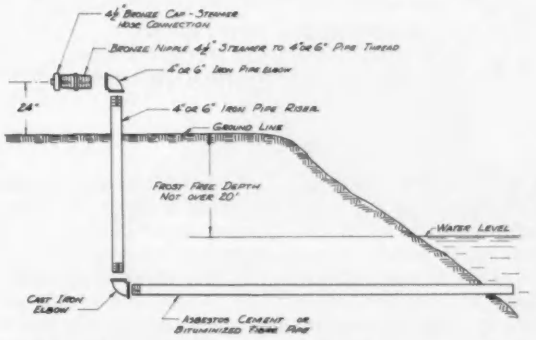
M. Loyd Fuller, Dallas, Texas, became president of the Association on January 1. Other officers are: Frederick Evans, Arnprior, Ontario, Canada, first vice president; Theodore W. Hart, Plainfield, New Jersey, second vice president; Paul O. Metcalfe, Greeneville, Tennessee, recording secretary, and J. B. Taliaferro, Jr., Tappahannock, Virginia, treasurer.

All elected officers serve as volunteers for one-year terms, as do more than 100 other appointed officers on state and provincial levels. The IRFAA will hold its 14th Annual Convention at the Hotel Roanoke, Roanoke, Virginia, November 2–4, 1961.

Making Use of a DRY HYDRANT



Details of screen layout — pond and stream sites.


4½" BRONZE CAP - STRAINER HOSE CONNECTION
BRONZE NIPPLE 4½" STRAINER TO 4 OR 6" PIPE THREAD
4 OR 6" IRON PIPE ELBOW
24"
4 OR 6" IRON PIPE RISER
GROUND LINE
FROST FREE DEPTH NOT OVER 20'
WATER LEVEL
CAST IRON ELBOW
ASBESTOS CEMENT OR BITUMINIZED FIBRE PIPE

Sketch of dry hydrant construction.

A NUMBER of rural fire departments have installed "dry hydrants" in certain localities to assure water supply for pumping and tank equipment. In outlying areas beyond the limits of a municipal hydrant supply, dry hydrants properly installed are particularly useful during severe winter weather when standing bodies of water might be covered by heavy ice. In warmer weather they are also used since silt and debris in ponds or streams can make drafting with pumps difficult.

On this page are sketches of a dry hydrant illustrated in a recent bulletin published by Professor E. W. Foss, Department of Agricultural Engineering, New York State College of Agriculture, Cornell University, Ithaca, New York. Professor Foss mentioned in the bulletin that two of these dry hydrant installations were placed at a pond and creek near the University campus. Experience with these indicates that the dry hydrant method of access to ice-covered water is better than other devices such as a brine barrel or a greased plug.

As shown in the illustrations, the dry hydrant used at Cornell has a strainer with ¼-inch maximum openings placed well under water. The bulletin states that the total strainer area of ¼-inch openings should be four times the cross-sectional area of the pipe. The pipe can be of steel, cast iron, bituminized fiber or asbestos cement, but bituminized pipe should not be used for dry hydrants operated under pressure.

For these two installations the lateral pipe from the water supply was laid with no slope to the riser which was located at a roadside. The riser was 4-inch steel pipe with the standard 4-inch elbow at the top; a brass nipple adapter with 4-inch Iron Pipe threads on one end and 4½-inch National Standard Hose threads on the other was screwed into the elbow. A bronze cap with a five-sided (hydrant) nut capped the nipple. The roadside installation was kept to a total height of less than 24 inches so that a protective box filled with hay or straw could cover it during freezing weather.

For the installation to the pond, a small backhoe was used to cut a trench through the pond dike while the pond was being drained to check fish population. The pipe line went to approximately the deepest portion of the pond, and the strainer was raised 12 inches above the bottom to keep it free of sediment. Crushed rock was then placed to cover the strainer to protect it from damage by movement or plugging with marine growth. Before backfilling the trench, a collar was cast around the pipe to prevent water from seeping through the pond dike or dam.

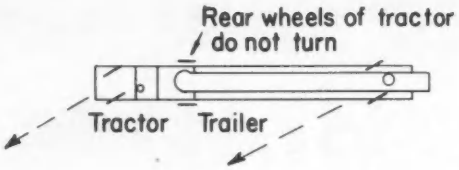
The installation for the creek was similar, but with the intention of placing the screen into the gravel bed of the creek deep enough to avoid damage from flood. However, because exceptionally high water developed in the creek some time later, the pipe was broken.

The table on this page shows the volumes of water obtained from one of these dry hydrants.

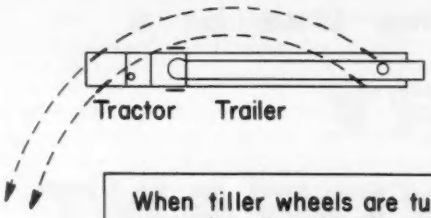
Gallons Per Minute Flow at 10 Lbs. Vacuum or 20 Ft. of Head*

Length	Steel Pipe (c = 120)		Cast Iron (c = 110)		Asbestos Cement (c = 130)		Bituminized Fiber (c = 120)	
	4" dia.	6" dia.	4" dia.	6" dia.	4" dia.	6" dia.	4" dia.	6" dia.
25′	1100	3400	1040	3060	1240	3650	1100	3400
50′	790	2300	720	2100	850	2500	790	2300
100′	540	1600	500	1475	590	1700	540	1600
500′	225	660	200	615	250	720	225	660
1000′	150	460	145	425	170	495	150	460

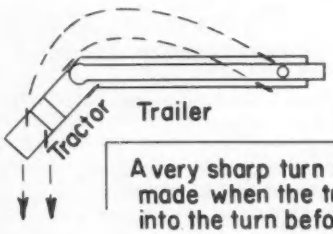
*(Based upon Hazen-Williams Formula with estimated values of C) Courtesy of Dr. Gilbert Levine.



When tiller wheels are turned in same direction as front wheels, whole truck moves sideways obliquely.



When tiller wheels are turned in opposite direction from the trailer the entire vehicle describes an arc.



A very sharp turn may be made when the tractor leads into the turn before the trailor.

THE TILLERMAN'S JOB

ONE activity in the fire service which captures the interest of any observer is the work of the tillerman on a tractor-drawn type of aerial ladder. It is thrilling to watch an aerial ladder truck weave in and out of traffic and negotiate turns that appear impossible. There is, however, much more to this tillerman's job than steering and maneuvering the rear end of the truck.

A tillerman, so called, must be thoroughly competent in handling his driving assignment. This means not alone straight-away travel but also backing up and placing the trailer at fires to insure safe operation of the aerial ladder. Distance from the base of the building, overhead obstructions, grades and slopes of the working area, along with the proper angles of operation with regard to the tractor placement are some factors he must consider. A knowledge of where fire alarm boxes are located and streets in the sub-district along with prescribed routes of travel and traffic conditions to be anticipated is very necessary if a tillerman is to do his job well.

Owing to the fact that the tillerman is generally the first man over the aerial ladder to ventilate from the roof down, he must have good climbing ability and be able to work efficiently at a great height. Work of this type embodies the principles of ventilation, and it is, therefore, wise to train tillermen in the proper techniques of opening up buildings for the purpose of ventilation. As these men must oftentimes work alone in hazardous areas, care must be observed that the men selected to do this job are mentally equipped to face dangerous situations without undue panic and be able to evaluate and report back to superiors the conditions that exist in a specific area of fire.

It has been found through experience that driver-tillerman *teams* work to advantage. It is a well-known and accepted fact that if a tillerman operates with the same driver most of the time, this team will grow to know each other's operating techniques and will develop into an efficient unit provided the supervisory factor is maintained by officer personnel and proper training opportunities are afforded. In some departments tillermen qualify for extra pay.

From the foregoing, it is fairly obvious that in selecting a new man for assignment as tillerman, care should be exercised to pick the proper individual and to give him sufficient training to produce good job performance. Driver training and skilled supervision must be provided. The importance of maneuvering the direction of the tiller wheels correctly must be emphasized. In most cases, this requires that the tiller wheels be turned or cut directly *opposite* to the cut of the tractor wheels in order to keep the trailer in alignment with the tractor. When this alignment or straight-away position is near accomplishment, a recovery turn of the tiller wheels must be made.

Tillermen being trained must be made aware of the overhang of the vehicle, because this is a definite factor in good or bad negotiation of turns and the placement of apparatus at fires. Such placement and the distances involved under varying conditions should be practiced in order that skills may be developed.

It is of utmost importance that the duties and precautions involved in "tiller" operations should be reviewed many times with prospective tillermen in order to prevent injury to themselves or others; also, to prevent undue property loss or damage to the apparatus from lack of knowledge on his part.

In taking tractor-trailer apparatus from the station, it is important that the tillerman keeps the ladder trailer end of the vehicle straight in line with the door so that turning of the tractor will not cause the side of the truck to strike the sides of the door. The tillerman must then cut the wheels sharply to make the necessary turn to right or left as the rear of the vehicle clears the door. While the operation may be performed more slowly, the tillerman also requires skill in backing the truck into the station.

In backing up a regular car or truck, turning the front wheels only toward the left effects a turn in the same direction. However, when backing up the trailer of an aerial ladder truck, if the tiller wheels are cut left, the trailer itself will move toward the right with a sideways motion. When backing into a narrow space such as an apparatus doorway, the trailer should be in line when entering so that the vehicle can move in a straight line.

A good system of buzzer signals between the tillerman and driver is essential to safe operation of the

vehicle. Generally, it is the officer's duty to see that the crew is in place on the apparatus before directing the driver to "roll" but the tillerman should signal the driver when he is ready to go. He should also signal if an emergency stop is necessary. In some fire departments the controls for the apparatus door are at the tillerman's position when the ladder truck is in quarters. Thus, the door is not opened until the tillerman is in place and operates the door opener. Accidents have occurred where the truck was driven before the tillerman was seated and ready. There have also been accidents where an overhead door was not fully opened before the man in the tiller seat reached the opening. Some departments have a red light and warning signal at the door to guard against this.

Meet the Champ

THE volunteer fire department of Devine, Texas, believes in taking its story to the public on a consistent basis. News reporter Don Lawrence has featured 260 consecutive weekly articles on fire department activities. This is believed to be something of a national record. In addition to the local articles, stories about the Devine Volunteer Fire Department have been prepared for the Houston *Chronicle* rotogravure magazine *TEXAS* by Mr. O. T. Baker of Devine. Mr. Lawrence would be interested in knowing of any other fire news series which might approach the record for consistent reporting of fire department activities that has been made at Devine.

"A token of appreciation which I accepted in behalf of the department."

CAIRNS HELMETS

THE FIREMAN'S FIRST LINE OF DEFENSE

SINCE 1836

In Top-Grain Leather

No. 5A
The "NEW YORKER"
REGULATION

Three other models in leather available, in both regulation and drop brim styles.

In One-Piece Aluminum

No. 350
The "SENATOR"
REGULATION

Also available in aluminum, in streamlined drop brim patterns.

In "Flint-Flex" Plastic

No. 900
The "CLIFTON"
REGULATION

Other approved styles, in plastic, are described in our Catalog.

"THERE IS NO SUBSTITUTE FOR EXPERIENCE"

Write for Catalog 360

CAIRNS & BRO., Inc. — Allwood, Clifton, N. J.

you can always count on
E&J dependability

THE NEW LYTPORT II
RESUSCITATOR • INHALATOR • ASPIRATOR

Precision-built to save the seconds that save lives. The dependable Lytport II is a product of 40 years' expert craftsmanship.

Pre-set pressures and simple controls permit immediate use. The Lytport II opens flat for instant access to all working parts. Entire instrument panel lifts out for best positioning.

In its sleek molded Fiberglas carrying case the Lytport II weighs only 28½ pounds (including oxygen cylinder). Rounded corners, oversize handles and perfect balance permit fast, easy carrying. Overall dimensions: 9½" wide, 10" high, and 24" long. Unit illustrated also accommodates two cylinders.

For dependable results put the Lytport II on your lifesaving team!

Ask your E&J dealer for a demonstration.

OHIO Ohio Chemical

For complete information, write Dept. F-1, Ohio Chemical & Surgical Equipment Co., Madison 10, Wisconsin • Ohio Chemical Pacific, Berkeley 10, California • Ohio Chemical Canada Limited, Toronto 2, Ontario; overseas, Airco Company International, New York City 17 (all divisions or subsidiaries of Air Reduction Company, Inc.)

HOW CONTRIBUTORY PENSIONS ARE TAXED

by Joseph Arkin, C.P.A.

PRIOR to the enactment of the Revenue Act of 1954 taxability of pensions was primarily based on the "3% rule." The 1954 Act established a new method which is best explained by examining Schedule E of Form 1040, individual income tax return, and assuming the following situation: A fireman retires at December 31, 1960 with an annual pension of $2000.00 and from that date has a life expectancy of sixteen years. Payments made to the pension fund amounted to $8000.00.

To illustrate:

1 — Investment in contract. This figure is usually the amount of contributions paid into the pension fund less any dividends or distributions received. If you started to receive a pension prior to January 1, 1954 you must subtract from the investment figure any amounts previously received as tax-free under the old 3% rule in prior years. In our example, $8000.00 was deducted from salary received as the fireman's contributions to the pension fund.

2 — Expected return. This is the amount which, measured from the starting date of retirement, you can expect to receive. It can either be a fixed sum for a specified number of years, or, as in our illustration, the fireman at his retirement will receive $2000.00 annually for life. Thus the expected return is $32,000.00 (16 years life expectancy × $2000.00 annual pension). Tables of life expectancy are published by

Schedule E. — INCOME FROM PENSIONS AND ANNUITIES (See Instructions, page 12)
Part I.—General Rule

1. Investment in contract	$ 8000.00	4. Amount received this year	$ 2000.00	
2. Expected return	$32000.00	5. Amount excludable (line 4 multiplied by line 3)	500.00	
3. Percentage of income to be excluded (line 1 divided by line 2)	25 %	6. Taxable portion (excess of line 4 over line 5)		$1500 00

Part II. — Where your employer has contributed all or part of the cost and your contribution will be recovered tax-free within three years. If your cost was fully recovered in prior years or if you did not contribute to the cost, enter the total amount received in line 5 omitting lines 1 through 4.

1. Cost of annuity (amounts you paid)	$	4. Amount received this year	$	
2. Cost received tax-free in past years				
3. Remainder of cost (line 1 less line 2)	$	5. Taxable portion (excess, if any, of line 4 over line 3)		

Sample tax form showing computation of taxable portion of contributory pension as discussed in this article.

the Internal Revenue Service and are available upon request, without charge, from any office of the District Director of Internal Revenue.

3 — Percentage of income to be excluded. The percentage is obtained by dividing "Investment" by "Expected return."

$$\frac{\$8000.00}{\$32000.00} = 25\%$$

4 — Amount received this year. Total amount of pension received in calendar year which in our illustration was set at $2000.00.

5 — Amount excludable. This is the amount received in the current year multiplied by the percentage arrived at under item 3. In our case, $2000.00 × 25% equals $500.00. No tax is paid on this amount.

6 — Taxable portion. This is the excess of item 4 over item 5. In our illustration, $2000.00 less $500.00 or balance as taxable income of $1500.00.

There are two important exceptions to the general rules outlined above. 1) If the municipality has paid part of the cost (has contributed to the pension fund) and the pension to be received in the first three years will equal or exceed the amounts of the retired fireman's pension contributions, all benefits are *non-taxable* until they equal the amount of the contributions paid in by the fireman, after which all benefits (the entire pension) are fully taxable each year. Persons who fall into this category are to use Part II of Schedule E.

In our illustration the amount received in the first three years is $6000.00 and does not equal or exceed the pension contributions made and hence the exception does not apply.

2) Where the retired fireman dies and the provisions of the pension plan provide for a "non-forfeitable" right at the time of death, a recomputation must be made if the beneficiary elects to use the annuity rules.

Retirement for Disability

Teachers, firemen, police officers, and others retired for disability before retirement age can report on their income tax return as "excludable income" their entire retirement allowance — the annuity portion (based on their own contributions), as well as the pension portion (the city's share).

A number of teachers in the 1st District, New York (Brooklyn), filed for refunds for 1954, 1955 and 1956 after learning that they were

Now Is the Time to
Measure *Your* Needs for Famous
INDIAN FIRE PUMPS!
"THE WORLD'S BEST"

All Models Approved by FACTORY MUTUAL

NEW
FIBERGLASS No. 90
MODEL — VERY POPULAR!

Light weight, yet strong and durable. Will not rust or corrode. Solid brass pump. *Send for circular.*

INDIANS are also available in Armco Zinc Grip Steel, brass or chrome tanks — No. 90 sliding pump type and No. 80 lever type pump and handle.

Send for NEW Catalog

D. B. SMITH & CO. *"for Over 73 Years the Leaders"*
408 MAIN ST., UTICA 2, N.Y.

PACIFIC COAST BRANCHES
Hercules Equipment & Rubber Co., Inc., San Francisco 7, Calif. and San Jose
Halprin Supply Co., Los Angeles 15, Calif.
Fred E. Barnett Co., Portland, Ore.
Fred E. Barnett Co., Klamath Falls, Ore.
Mill & Mine Supply, Inc., Seattle, Wash.
L. M. Curtis & Sons, Salt Lake City, Utah

CANADIAN AGENTS
Fleck Bros. Limited, Vancouver, B.C.
C. E. Hickey & Sons, Ltd., Hamilton

"PRETTY GOOD" IS NO GOOD!
ON RESCUE JOBS!
Depend on the P-F® HYDRAULIC
RESCUE KITS

THEY'RE BETTER, FASTER, SURER!

In accident rescue equipment you can't rely on pretty good tools. They must be the *best!* That is why the famous P-F RESCUE KITS get to work *faster* when the need is for life-saving action — *FAST!* Gives you all the necessary attachments for speedy action — backed by the powerful 10-ton Hydraulic Jack in the RK-4 Kit, and the fast 4-ton Jack with the RK-1 Kit.

MAKES PRY-BARS, HACKSAWS, TORCHES LOOK LIKE SLOW-MOTION, IN TIGHT SPOTS

Every P-F RESCUE KIT is easily assembled for every kind of rescue job — no heart-breaking delays! Your men are there, *fast* and *ready* when the call comes. Can you say the same for your present rescue equipment? Better mail the coupon — below.

READ

the complete story of the P-F RESCUE KITS — how they can speed your rescue operations — in free RESCUE KIT Bulletin. Mail the Coupon TODAY!

H. K. PORTER, INC.
Dept. F-10, 74 Foley Street
Somerville 43, Mass.
Please send me your P-F RESCUE KIT Bulletin — with complete story on Models RK-4 and RK-1.
NAME.....
TITLE.....
ADDRESS.....
CITY.....STATE.....

NOW...Fyrepel offers you complete heat protection with the all new 9148 OVERHOOD

- Aluminized Glass Cloth
- 180° arc of vision
- Fits secure and snug

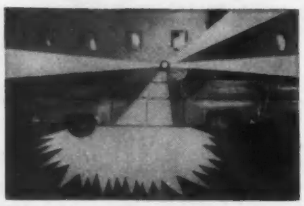
The 9148 snaps quickly and easily on to the brim of any fire helmet—gives excellent radiant heat protection to face, neck, chest and shoulders. Breathing apparatus can be worn beneath hood. The face piece, frame and drape are all detachable for easy part replacement.

Write for details on Fyrepel's complete line of fire fighting clothing and equipment.

FYREPEL PRODUCTS INC.
NEWARK, O.

SIRENO (TRADE MARK)
"SKY-LIGHTER"

NEW CONCEPT IN WARNING LIGHTS
Combines the features of the Red Revolving Ray with WHITE LIGHT in one compact unit.



Two high intensity WHITE SEALED BEAM BULBS revolve thru 360° — one is aimed up into the sky; the other down to illuminate the vehicle and ground.

Write Dept. 27 for FREE bulletin
SIRENO SIGNAL Mfg. Corp.
67 PASSAIC AVENUE, KEARNY, N. J.
Please send bulletin and information.
Name_____
Street_____
City_____

not supposed to pay tax on pensions received because of their being retired for disability reasons.

Lester W. Utter, Chief of the Individual Income Tax Branch of the Office of the Commissioner of Internal Revenue, wrote to the Teachers Union on March 21, 1957: "Section 1,105–4 (a) (33) (i) of the Income Tax Regulations issued under the 1954 Code provides, in part, that if a plan provides that an employee who is absent from work on account of a personal injury or sickness will receive a disability pension as long as he is disabled, section 105 (d) is applicable to any payment which such an employee receives under the plan *before he reaches retirement age.*"

Section 105 (d) is that section which provides that salary received by an employee during periods of illness is deductible up to $100.00 per week if the employee is covered by a "wage continuation plan."

Tax regulations and decisions are in a constant state of flux and firemen are advised to check with the local office of the Internal Revenue Service regarding questions of which there is any doubt.

(*Because fire department pension plans differ from city to city, readers who may be affected by the rulings of the Internal Revenue Service mentioned in this article should consult with a tax specialist, such as a lawyer or certified accountant, for explanation of the complete deduction allowances under present tax law. Some fire service associations provide this advice for their members. The November, 1960, issue of the "International Fire Fighter," published by the International Association of Fire Fighters, mentioned that a number of retired fire fighters received tax refunds after the appropriate tax rulings pertaining to pensions were interpreted for them.* — Ed.)

Anthony J. Mullaney

ANTHONY J. MULLANEY, retired Fire Commissioner of Chicago and well-known fire service leader, died November 28 after an extended illness. Rising from the ranks of the Chicago Fire Department, "Tony" Mullaney achieved wide recognition as Chief of the Department. He served for four years as a director of the NFPA (1944–1948) and participated in the work of several technical committees.

SELF-CONTAINED MACK PUMPERS are ready for any kind of blaze. Here, one of Portsmouth's new C-85 1000-gpm pumpers takes suction from a nearby creek, while firemen play out the hoses. Second C-85 cab-forward unit stands by. Progress is reported on two-way radio which fits compactly in cab compartment. Both pumpers and a third on duty with another company feature 500-gallon booster tanks . . . 4½" suction hose . . . have space for 1500' of 2½" and 800' of 1½" hose. Each is powered by a Mack Thermodyne engine developing 276 hp and 640 ft./lbs. of torque.

When Portsmouth *"trips the horses"* the Macks really roll

Answering an alarm in Portsmouth, Va., means Macks on the job pronto, whether it's a routine drill, brush fire or a blaze in high-value industrial waterfront property.

Because of this quick response, Chief Odell Benton's efficiently manned Portsmouth Fire Department long ago learned they could rely on dependable Mack apparatus. In the past 17 years, Mack equipment has been found in the front lines of the busiest companies in the department.

Portsmouth's three new cab-forward Mack pumpers maintain the same high tradition . . . in only nine months they have won high praise for their performance.

Mack apparatus pass every performance test for good reasons—Mack Thermodyne® engines, gasoline or diesel, to 276 hp . . . automatic or standard transmissions . . . air or hydraulic brakes . . . and the gear ratios and equipment you need for the most demanding fire-fighting assignment.

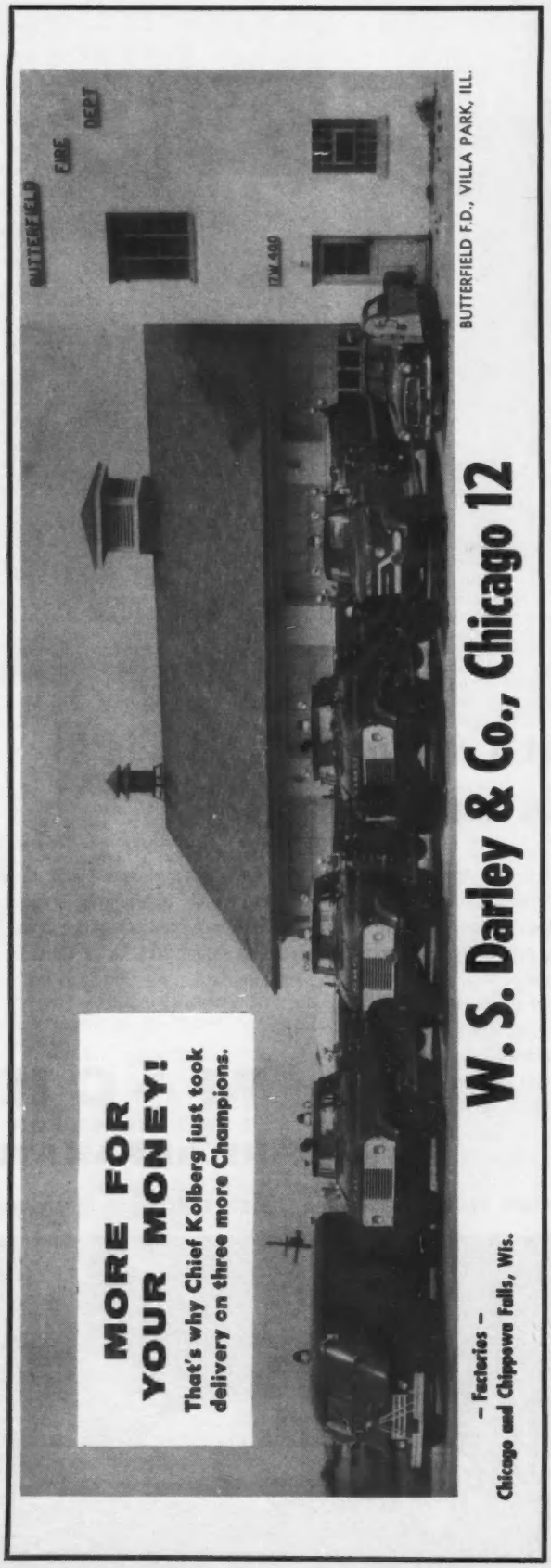
Investigate adding steady-performing Mack apparatus to your department. Performance records show Mack apparatus to be the most dependable in the service. Mack Fire Apparatus, Allentown, Pennsylvania. Mack Trucks of Canada, Ltd., Toronto, Ontario.

6063

MACK
FIRST NAME FOR
FIRE APPARATUS

COMPLETE LINE OF PUMPERS—500 to 1250 GPM...SQUAD AND HOSE WAGONS...AERIALS 65' to 146'...COMBINATION LADDER TRUCKS

SPLIT-SECOND RESPONSE—Both highly trained Portsmouth Fire Department and its Mack fire apparatus are on the move as soon as the bell sounds. Portsmouth took delivery of its first Mack pumpers in 1943 . . . still has them operating.


MORE FOR
YOUR MONEY!
That's why Chief Kolberg just took
delivery on three more Champions.
W. S. Darley & Co., Chicago 12
– Factories –
Chicago and Chippewa Falls, Wis.
BUTTERFIELD F.D., VILLA PARK, ILL.

Insignia Collector

Fireman Maurice Scott of the Leeds City Fire Brigade, Southern Fire Station, Dewsbury Road, Leeds, England, has been collecting cap badges and shoulder emblems for a number of years. He reports that he has about 400 items in his collection which includes only 15 badges from the U. S. A portion of his collection is shown in the photo above. He would like to hear from readers of FIREMEN magazine who can help him in his hobby.

"Card Game" for Firemen

CHIEF Ellis Rawnsley, of the Terrace Park, Ohio, Volunteer Fire Department, has come up with an idea for an entertaining but practical card game for volunteer or part-time firemen. For the men of his department, he has developed a pack of index cards with each card having a question about equipment, fire department operation and other essential information. The cards are shuffled and dealt to a group of firemen. Each man then turns his card over and attempts to give the correct answer to the question.

Chief Rawnsley reports that additions are being made to the pack of cards continually and that the purchase of a new piece of apparatus and the formation of a rescue squad has brought many more questions.

He states "Even with the most willing crew and with drill sessions once a week, it's almost impossible to cover everything a well-trained fireman should know.

"The 'game' seems to be a simple way of covering a lot of ground in a short time and checking each man's knowledge of important items."

Cartoon by Geo. Price; © 1960 The New Yorker Magazine, Inc.

National Fire Protection Association

FIRE REPORT

Mail promptly to NATIONAL FIRE PROTECTION ASSOCIATION, 60 Batterymarch Street, Boston 10, Mass.

Date of fire.....Day of week.....Time.....A.M.....P.M.
Location of property (Street, City, State).....
Name of principal tenant.....
Type of occupancy (Give specific use of property).....

Length.....Width.....If irregular shape give Sq. Ft. Area of Ground Floor.....Height.....No. of Stories.....
Walls (Wood, brick, concrete, etc.).....Floor framing (Wood, steel, heavy timber, etc.).....Roof framing (Wood, steel, etc.).....
Floor covering (Wood, concrete, terrazzo, etc.).....Roof covering (Asphalt shingle, built-up, etc.).....

How discovered (Auto alarm, occupant, explosion, etc.).....Was discovery delayed, yes or no?.....
If "yes," give reason (No watchman or alarm system, occupants asleep, etc.).....
How was alarm transmitted?.....Was transmittal delayed, yes or no?.....
If "yes," give reason (Occupants fought fire, no fire alarm box, etc.).....
State if property operating or not, vacant, under construction, etc.....
If possible, estimate time fire burned before discovery.....

Room or place where fire started.....Which story?.....
Was fire confined to place of origin, yes or no?.....If "no," give extent within building.....
.....
Did it spread beyond building of origin, yes or no?.....If "yes," what other property was involved?.....
.....

Indicate ignition source and material ignited. If uncertain describe what appears to have happened:.....
.....
.....
.....
.....
Was fire purposely set, yes or no?.....Was arson suspected, yes or no?.....Report result of investigation above.

Response (give number). Companies....., Engines....., Ladders....., Rescues or squads....., Other.....
No. hose streams used: 3½- or 3-in.....; 2½-in....., 1½-in....., Booster.....
Was there a prearranged mutual aid plan, yes or no?.....Was mutual aid used, yes or no?.....If "yes," give names of other fire departments responding.....

Automatic sprinklers, yes or no?.....Type (Wet, dry, deluge, etc.).....Supervised, yes or no?.....No. heads opened.....
Effect of sprinklers: Extinguished fire, yes or no?.....Held fire in check, yes or no?.....Unsatisfactory, yes or no?.....
Reason for unsatisfactory sprinkler performance.....
Was fire department connection used, yes or no?.....If "no," explain.....
Automatic fire detection system, yes or no?.....Type (Rate of rise, fixed temp., etc.).....Central station supervised, yes or no?.....
Was performance satisfactory, yes or no?.....If "no," explain.....
Watchman at time of fire, yes or no?.....Supervised, yes or no?.....Did he make regular rounds, yes or no?.....
If "yes," give frequency of rounds and any pertinent particulars.....
Watchman performance satisfactory, yes or no?.....Reason for unsatisfactory performance.....
.....
Extinguishers used (Number, type, size and effectiveness).....
Other private protection used (Standpipe hose, fixed CO_2, etc., and effectiveness).....
.....
If **lightning** was cause of fire, was building rodded, yes or no?.....Was lightning protection in good condition?.....

Loss of life (State age and sex).....Cause of loss of life.....
Personal injury.....
Sound value of buildings $.....Estimated building loss $.....
Sound value of contents $.....Estimated contents loss $.....
Total value $.....Estimated total loss $.....

(OVER)

FACTORS INFLUENCING FIRE SPREAD AND EXTENT OF DAMAGE

1. **Structural deficiencies influencing fire spread**.....
Open stair or elevator shafts; non-fire-stopped walls, etc.; undivided attic; lack of fire walls; combustible
.....
fibreboard interior finish; combustible insulation; windowless walls; etc.
.....
.....

2. **Fire protection deficiencies influencing fire spread**.....
Fire door blocked open; inadequate water supplies for fire fighting (estimate flow available); poor
.....
hydrant spacing (give spacing); distance from nearest fire department; no private fire brigade, etc.
.....

3. **Contents features influencing fire spread**.....
Poor stock subdivision; high piled stock; windows blocked; flammable liquids
.....
improperly stored or handled; poor housekeeping; dust accumulation; oil on floor, walls, etc.
.....

4. **Record losses and performance of safes and vaults**.....

5. **Salvage operations during and after fire**.....
.....

REMARKS

Use this space to report other details that would contribute to an understanding of the factors responsible for this fire — weather conditions, poor water supplies, inadequate manpower and equipment, etc. Include a sketch and additional sheets where appropriate.

.....
Reporting Officer or Inspector *Rank*

The NFPA is a nonprofit association, organized for the sole purpose of protecting life and property from fires and explosions. Fire experience is the basis for the technical and educational fire prevention activities of the Association.

Stop Highway Fires!

The only way you can prevent highway fires from becoming major disasters in your community is to put them out as quickly as possible. Rockwood fire fighting products bring you that positive protection.

- **Using Rockwood nozzles or turrets, on fire trucks or on the ground, you can hit fires harder.**
- **Using Rockwood FOAM liquid, single or double strength, you can throw a quickly smothering blanket over fires in flammable fluids and other combustibles.**

Rockwood nozzles and turrets fight fires four ways: with solid water stream, solid FOAM stream, FogFOAM and WaterFOG. For over half a century, throughout the country, Rockwood's highly advanced fire fighting aids have been proving their ability to save lives and property. Make sure your own department has these dependable tools. For a large, illustrated booklet on this complete line, write to Rockwood Sprinkler Company, Portable Fire Protection Division, 427 Harlow Street, Worcester 5, Massachusetts.

SG-60 Nozzle with FF Extension. Like all Rockwood Nozzles and Turrets, this discharges straight water stream or WaterFOG, solid FOAM stream or FogFOAM.

Rockwood makes the most complete line of Specialty Turrets in the market. Types include Direct Manual Control (shown), Extended Manual Control, Remote Manual Control, Remote Hydraulic Control and Portable.

Rockwood Double Strength FOAM Liquid is mixed 3 parts with 97 parts water. This forms a blanket with proved ability to extinguish fires in flammable liquids with maximum speed and safety.

ROCKWOOD SPRINKLER COMPANY

A Division of The Gamewell Company
A Subsidiary of E. W. Bliss Company

Engineers Water . . . to cut fire losses

Distributors in all principal cities

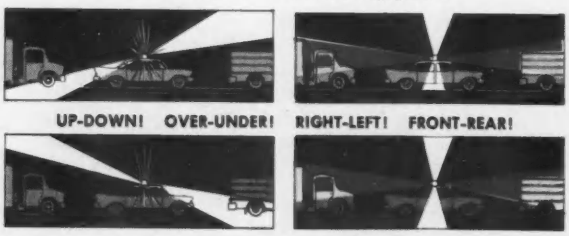
ONE FINGER OF LIGHT SLANTS TOWARD THE SKY— THE OTHER FLOODS TOWARD THE GROUND WHILE ALTERNATE BEAMS OF RED (or other color) BACK TO BACK, PROJECT AT EYE LEVEL!

The STRAT-O-RAY, with its *four powerful sealed beams,* rotating 360 degrees, is FEDERAL'S newest and finest contribution to *safer* emergency vehicle operation.

The *tilted* beams are on a separate circuit from the *horizontal* color lamps. The three position switch permits use of *color only,* to produce the effective and familiar warning of the famous Beacon Ray; the other "on" position of the switch operates *all lamps for full STRAT-O-RAY effect.*

The STRAT-O-RAY is the same size and shape as the Super Beacon Ray and is equally durable and dependable! Be sure you specify the FEDERAL STRAT-O-RAY light and the Class "Q" Coaster Siren for *your* new apparatus.

Write today for FEDERAL Catalog #300.



UP-DOWN! OVER-UNDER! RIGHT-LEFT! FRONT-REAR!

FEDERAL SIGN and SIGNAL Corporation

13617 S. Western Ave., Blue Island, Ill.

New Station for Volunteers

Chief Fred Loveland reports that his Belltown Fire Department, Inc., recently dedicated this new station in Stamford, Connecticut. Featuring a four-bay apparatus room and a complete Gamewell alarm system, the new station covers 9,000 square feet of land and replaces an old wood frame fire station building which served the department for many years. The fire company has three pumpers: a 1934 Buffalo 750 gpm pumper, a 1949 Mack 1,000 gpm pumper and a 1954 Mack 750 gpm pumper.

A Change in New York

THE complete fire program of the state of New York is now under the Division of Fire Safety, which is part of the Office for Local Government, Executive Department of the State of New York. George H. Proper, Jr., is acting director. Headquarters for the Division are at 155 Washington Avenue, Albany 10, New York.

Safety Field Representatives are Francis W. Crowley, Elmira Heights; John J. Danahy, Buffalo; Francis Brown, West Carthage; Sylvester A. Delaney, Albany; and Francis A. Bourassa, Latham.

The Division of Fire Safety administers the state fire mobilization and mutual aid programs, helps bring the state fire safety program to private schools, and acts as a clearinghouse of information for fire departments of New York.

New Station in San Diego

The San Diego, California, Fire Department, headed by Chief George E. Courser, recently dedicated this new station housing Engine Co. No. 28. Designed by the architectural firm of Wulff and Fifield, the building has an area of 3,759 square feet and features an apparatus room, dormitory, locker room, toilet facilities, maintenance shop, kitchen and recreation area. The hose drying tower shown in the center of the structure rises only twenty feet above the ground, with the remaining ten feet of the tower underground. A sump pump was installed in the bottom to carry off water from the drying hoses. The station was built of concrete blocks with a reinforced concrete roof. *(Photo by Hazard Products, Inc.)*

POWHATAN
Presents

Their New

"BALL TYPE" VALVE & SIAMESE

QUARTER-TURN

FULL FLOW

RUGGED CONSTRUCTION

OPERATES EASILY UNDER HIGH PRESSURE

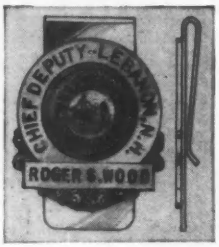
Body painted red with polished bronze or chromium plated trim.
Pin Lug or Sensible Lug Swivel.

POWHATAN BRASS & IRON WORKS
RANSON, WEST VIRGINIA
In The Same Location Since 1892

NIELSEN-RIONDA

BADGES

Superior Solid Backs



- Money Clips - All Badges - No Extra Charge
- 10 Year Guaranteed Hat & Coat Attachments
- Sta-Brite the Lifetime Metal

Write for Free 32-Page Catalog to Dept. FI

NIELSEN • RIONDA Inc.
40 JOHN ST., NEW YORK 38, N. Y.

INDEX TO ADVERTISERS

	Page
Akron Brass Manufacturing Company, Inc.	30
American Film Producers	29
American Fire Apparatus Company	2
Cairns & Brother, Inc.	19
Carpenter Manufacturing Company	32
W. S. Darley & Company	24
Elkhart Brass Manufacturing Company, Inc.	4
F D Products	29
Federal Sign and Signal Corporation	26
Fyrepel Products, Inc.	22
Hook-Fast Specialties, Inc.	29
Mack Trucks, Inc.	23
Mueller Company	3
Nielsen-Rionda, Inc.	28
Ohio Chemical & Surgical Equipment Company	20
H. K. Porter, Inc.	22
Powhatan Brass & Iron Works	27
Roberts Company	29
Rockwood Sprinkler Company	25
Seagrave Corporation	5
Sireno Signal Manufacturing Corporation	22
D. B. Smith & Company	21

this month's *News and New Products*

Sparky Car for Portland

The fire department in Portland, Maine, is making use of this bright red 1961 Corvair for its Sparky Fire Prevention Program. As shown in the photo, a head of Sparky is fastened to the roof. The car also features a public address system by which the driver or some other occupant of the car can deliver messages to the public. Since the car has proven very popular with children, arrangements are now being made to wire the P. A. system so that recorded messages will be broadcast if anyone touches any portion of the car.

Portland's fire chief, Carl P. Johnson, recently brought the car to Boston to show it to the NFPA staff. The group above, shown outside the NFPA building at 60 Batterymarch Street, includes (left to right): NFPA General Manager Percy Bugbee; Deuel Richardson, Public Relations Manager; Paul R. Lyons, Editor, FIREMEN magazine; Henry S. Gere, Advertising Manager; Chief Johnson; Assistant Chief John E. Clougherty, Boston Fire Department, and Captain Woodbury Ridley, Portland Fire Prevention Bureau. Chief Johnson stated that the car was loaned to his fire department by the J[illegible] City Motor Company of Portland until next summer. (*Boston Fire Department Photo by John J. Kelly*)

Front-Mounted Deluge Gun for Rural Pumper

Rural pumper delivered by Harry Sutphen and Associates, Columbus, Ohio, has 750 gpm American front-mount pump with deluge gun mounted to discharge directly from top of pump. The gun is equipped with 1½-inch Akron fog nozzle with proportioner for discharging foam or wet water through the gun. The gun permits immediate attack on a fire using water from the large booster tank as soon as the apparatus reaches a fire before hose is laid. The truck is also equipped with a Hannay power-operated booster reel and two preconnected lines of 1½-inch hose piped to the rear of the hose body.

Fire and Rescue Boat

This small, fast, maneuverable boat was designed particularly for fire and rescue work. Powered by a jet turbine pump, it is 19 feet long, travels 40 miles per hour and has a very shallow draft. It can turn in its own length at full speed and is small enough to be hauled on a trailer or carried by a helicopter. The pump can deliver 2,500 gallons per minute. This model has a front-mounted monitor nozzle and fixed combination models mounted fore and aft supplied by piping from the pump. For details, write Robert J. Rodi, president, Fire and Rescue Boats, 2525 S. Ashland Avenue, Chicago 8.

G-E Two-Way Radios

Fifty-six new General Electric two-way radios are in use in the Baltimore Fire Department, installed under a lease-maintenance contract between the city and G-E's Communication Products Department. The prime contract is between G-E and the Baltimore-Transit-Traffic Department, which now supplies communications to several city agencies. However, the fire department, as well as police and water departments, retained its own dispatching system. It ties in to the new center by direct line. For information, write General Electric, Communication Products Department, Lynchburg, Virginia.

FD RESCUE MARKERS

TO "I"DENTIFY HOMES OF THE AGED, BEDRIDDEN, BLIND AND HANDICAPPED

FIRE I DEPARTMENT

ASK FOR FREE SAMPLE KIT

MEMBER FD

FIREMEN — Identify your car as an EMERGENCY VEHICLE with a **"DUAL GLOW" AUTO EMBLEM**

"Reflective" at night —Extra Bright by day

4½" Diam.

2 for $1.00 — Send today for yours

FD PRODUCTS

Dept. F-18

90-N1 TRACEY PL., ENGLEWOOD, N. J.

REACH THE YOUNGSTERS!

Actual Sizes — Diameter
"Sparky" 1⅜" — "Junior" 1⅛"

Here are two first quality, low-priced items for your Spring Clean-Up Campaign in Schools and your Junior Fire Dept. Program.

- "SPARKY" FIRE DEPT. BADGE
- JUNIOR FIRE DEPT. BADGE

With your community name stamped on the Junior Fire Dept. Badge:

15c each in lots of 500
plus postage

Standard "Sparky" Fire Dept. badges are 15c each in dozen lots plus postage.

Send 20c for sample of either badge to

ROBERTS CO.
BOX 444D WAYLAND, MASS.

FOR SALE

1 Federal triple combination air horn, two 8" and one 10" diaphragm.
1 electric and hand valve, 1½", 24 volts, in weatherproof housing with thermal heating.
Federal pull boxes, open circuit, coded, eight weatherproof and three non-weatherproof.
1 punch tape register, 24 volts, open circuit.
1 take-up reel.
1 rectifier and relay, 24 volts.
1 20" x 48" A.S.M.E. steel tank, 150 lb. P.S.I.

Any reasonable offer accepted

Write to:

Daniel T. Conroy, Secretary
Bethpage Fire District
Bethpage, New York

FIREMEN!

INCREASE YOUR INCOME!

Convert your spare time into steady income selling most popular line of Belts and Buckles with Fireman's personal initials, first name or nickname with miniature replicas of actual fire equipment beautifully enameled, also lapels, tie clasps, key chains, money clips, and cuff links. Excellent repeat business. We furnish you with FREE complete sales kit. Really nice part-time money producing items.

NO INVESTMENT NECESSARY!

For full particulars, write to

HOOK-FAST SPECIALTIES, INC.
Factory — 16 Eudora St.
P.O. Box 1425F Providence, R. I.

"STAND BY, FIREMEN —
There's
HOT NEWS
Coming in the
next *ISSUE!"*

"RESCUE BREATHING" ©1958

the FIRST and ONLY SAFETY FILM

teaching the NEW methods of MOUTH-TO-MOUTH RESUSCITATION that . . .

- has been officially approved for purchase under the Federal Contributions Program.
- was officially approved and endorsed as a teaching film by the New York and American Societies of Anesthesiologists.
- has won THREE National film awards: the NATIONAL SAFETY FILM CONTEST, the EFLA BLUE RIBBON and the CHRIS AWARD.
- was produced under the technical supervision of the foremost MEDICAL authorities on the subject.

Running Time — 21½ Minutes
16mm Color Sound Print . . $200
16mm B&W Sound Print . . $110
25% Discount on 6 or More Prints
Now available in ENGLISH, FRENCH, SPANISH and PORTUGUESE versions. Please specify language version you wish to purchase.

Send Orders or Requests for Previews-for-Purchase to:

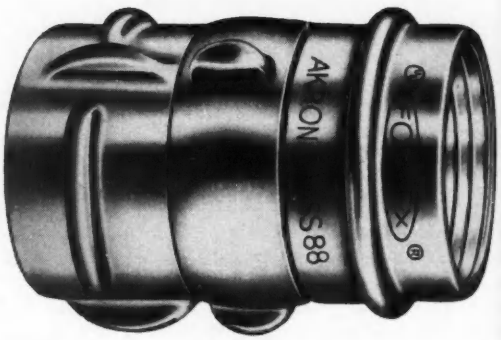
AMERICAN FILM PRODUCERS
Dept. RB-2
1600 Broadway, New York 19, N.Y. • PL 7-5915

AKRON'S TOUGHER FORGED COUPLINGS

Tapered hose bowl grips like a vise!

The hose will blow before the coupling will go!

FORGEX®



Style 88

ROCKER-RING®

Style 92

Drop-forged under the tremendous force of hydraulic presses, Akron Rocker-Ring and Forgex couplings give you greater density, strength and toughness . . . the trouble-free service you're looking for.

Two models for you: the lightweight, three-lug Forgex, and the heavy-duty two-lug Rocker-Ring . . . both guaranteed to give you complete satisfaction.

Brass—reinforced with manganese—drop-forged

Rocker-Ring for added protection to threads and swivel—for added strength in the hose bowls

Tapered hose bowl holds hose in vise-like grip—no slipping at any pressure

High pressure—the hose will blow before the coupling will go

Threads—any 2½" and 1½" threads

Hose—fit all fire hose

Higbee thread and indicators

Underwriter's listed

— FORGEX® ROCKER-RING 3-Lug Coupling. Forgex comes in the smaller hose bowl sizes, perfectly tailored for the new lightweight hoses. A lightweight, tough, three-lug, drop-forged coupling for use on all 1½" or 2½" fire hose—dacron or cotton—any thread. Satin finish. Brass with manganese.

— ROCKER-RING® 2-Lug Coupling. The heavy-duty drop-forged coupling for departments that want the best where service is the toughest. Satin finish. Brass with manganese.

Style	Size	Rockerlugs	Length	Weight Lbs.
88	1½"	3	4½"	2⅜
88	2½"	3	5⅜"	4½
92	1½"	2	4½"	2¾
92	2½"	2	5¾"	6⅛

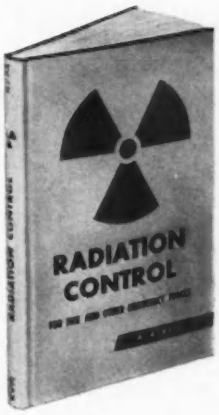
See New Akron Brass Catalog 60—Page 62

AKRON BRASS
FIRE FIGHTING EQUIPMENT

AKRON BRASS MFG. COMPANY, INC.
WOOSTER, OHIO
AKRON MFG. (CANADA), LTD.
AYLMER, ONTARIO

Do you have RADIATION CONTROL

For Fire and Other Emergency Forces?



By Andrew A. Keil, Radiological Officer,
New York Fire Department

Assisted by Fred N. Brandkamp and the following contributors, all of the New York Fire Department: Michael J. Costello, Alfred R. Karteron, Mark Lessing, Walter R. McGill, Irwin Purisch, Albert W. Ring and Herman Thiele.

Here is a useful book for fire department personnel who may be responsible for setting up radiation control procedures. It gathers together a great deal of technical information on the fundamentals of nuclear radiation and explains the hazards of radioactive materials, the various limits of exposure for human beings, methods and equipment for detecting radiation, and how fire departments and other emergency forces should handle such an emergency.

This is another valuable book for fire department reference libraries. Copies can be obtained now by using the convenient order blank below.

ORDER BLANK

National Fire Protection Association F-1-61
60 Batterymarch Street, Boston 10, Mass.

Gentlemen:

Please send me.....copies of the new book, "Radiation Control" at $4.75 per copy.

Name .....

Address .....

City..... Zone..... State.....

☐ Please bill me. ☐ Check for.....dollars is enclosed.

Some of the Things Covered by This Book

Description of actual situations involving radioactivity which have been faced by fire and emergency forces.

Training in operations by which fire forces may identify situations with nuclear radiation dangers.

Effects of nuclear radiation on the human body.

Procedures for determining when emergency personnel have been significantly exposed to radiation.

The instruments by which radioactivity is measured.

Special points to cover in fire department inspections of property where radiation hazards may exist.

Modification of standard fire fighting procedures made necessary by radiation.

Description of radiation machines and reactors which produce radioactivity.

Description of common uses of radioisotopes and other radioactive materials.

What radioactive materials look like and a description of typical containers.

Discussion of the present development of regulations on transportation of radioactive materials.

How to clean up after radioactive materials have been spilled: decontamination.

Nuclear bomb effects and fallout.

$4.75 per copy

Clothbound

256 pages — 5½- by 8½-in.

FIREMEN
60 BATTERYMARCH ST.
BOSTON 10, MASS., U. S. A.

POSTMASTER: If undeliverable FOR ANY REASON, notify sender, stating reason, on Form 3547.

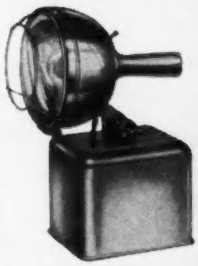
CARPENTER "PORTALITES" WITH RECHARGEABLE BATTERIES

DESIGNED FOR MODERATE TO FREQUENT USAGE . . .

CARPENTER-LIGHTS with heavy-duty rechargeable batteries are ideal units for frequent-use applications. Savings over dry battery replacements pay off the initial cost-differential after 50-75 hours of use. Corrosion-proof terminals plus efficient spring contacts allow insertion of spare batteries in only 10 seconds! . . . another Carpenter exclusive. Batteries are essentially nonspillable . . . may be placed in any practical position.

PRICES:
WS-6 . . . **$49.50**
Super-6 . . . **$45.00**
Running board holder . . . **$4.00**
Smoke-fog penetrating lens – **extra $1.00**

Type WS-6 *(Illus. above left)* The ideal light for chiefs and officers. Especially valuable for rescue work . . . where seconds count, it is on the job before mounted searchlights can be positioned. Operates as powerful searchlight or worklight. One battery charge gives 24 hours continuous service as worklight or 6 to 8 hours as searchlight . . . much longer if used intermittently. Only 12 lbs. including battery! Convenient finger-tip, self-balancing handle and beautiful duro-satin finish. Available with running board holder and smoke-fog penetrating lens as optional extras.
Type Super-6 *(Illus. right)* is the same fine basic unit except with rugged one-piece handle and housing.



Automotive Lights

CARPENTER-LIGHTS OFFER:

ULTRA-POWER . . .

the brilliancy you need to **see** danger, **warn** of danger, and **prevent** danger. Every component from battery and bulb to reflector and lens is designed to give **maximum** light.

DEPENDABILITY . . .

The peace of mind that comes from knowing every light is designed, built, and inspected to the rigid standards which have made the Carpenter name famous.

RUGGED CONSTRUCTION . . .

built to withstand the use and abuse of many years' service under the most trying conditions. No compromise on quality.

Beacon Lights

"Portalites"

Automatic Emergency Lights

NEVER SETTLE FOR LESS!

MANY OTHER LIGHTS INCLUDING U. S. BUREAU OF MINES PERMISSIBLE
COMPLETE CATALOG ON REQUEST

CARPENTER MFG. COMPANY 949 BRADLEY STREET SOMERVILLE 45, MASS.